Gas Journal

VOL. 282. 107th YEAR. LONDON, MAY 11, 1955 No 4797. PRICE 1/3

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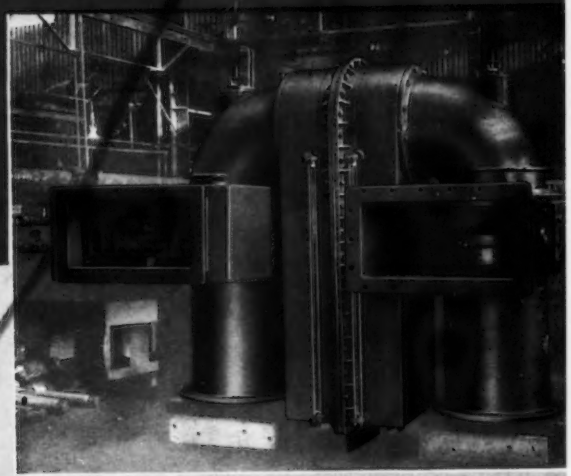

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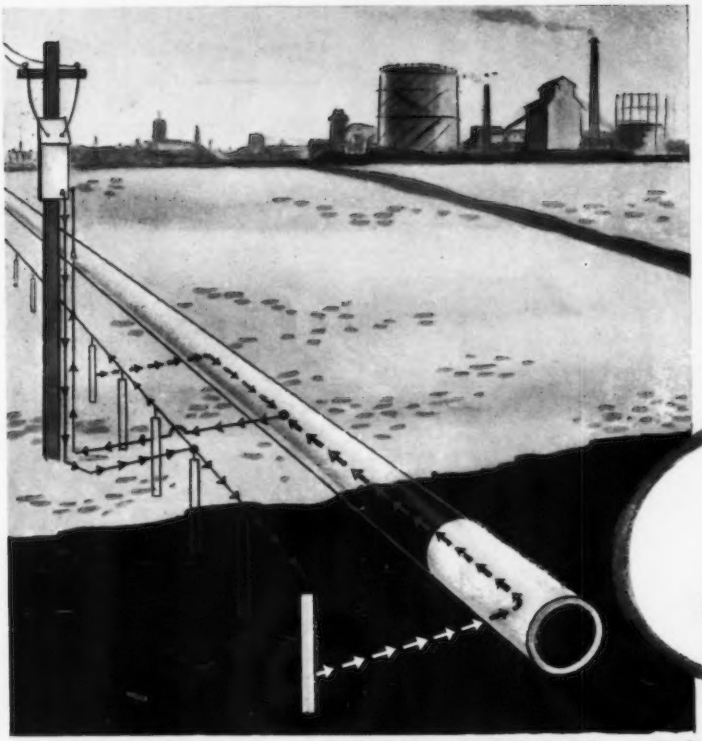

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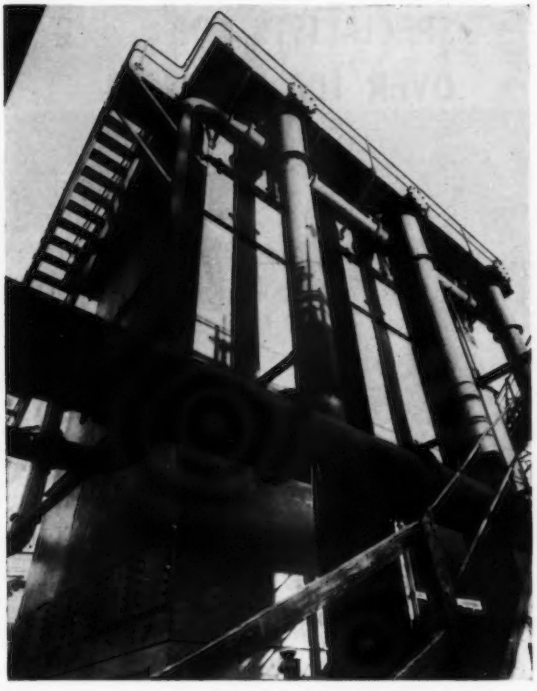

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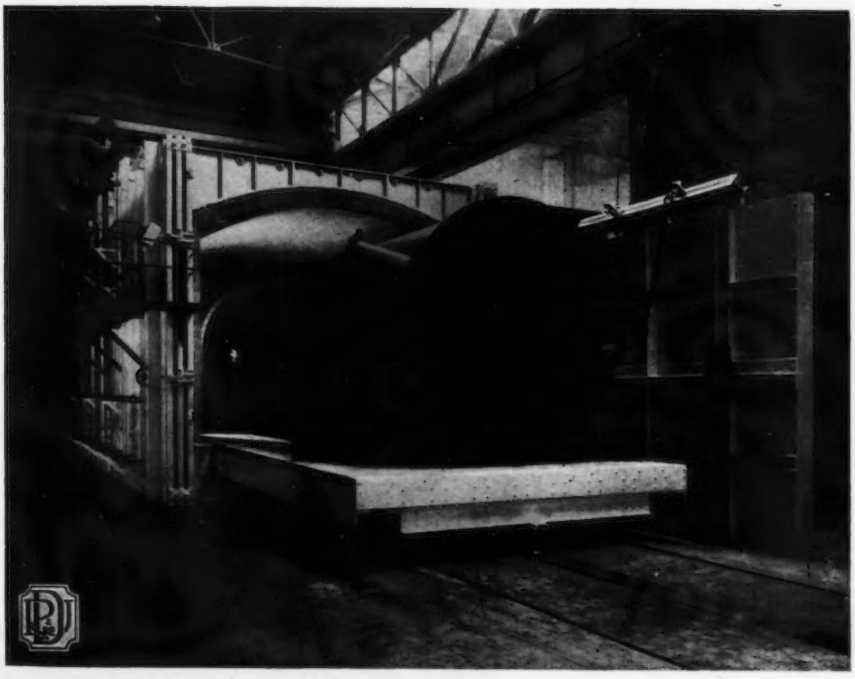

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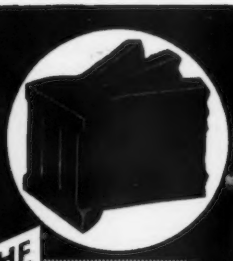

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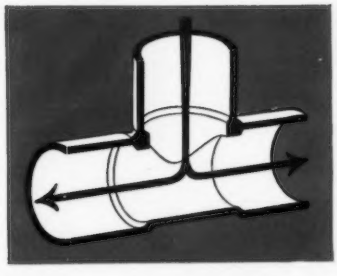

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1	420
1¼	650
1½	900
2	1600
2½	2500

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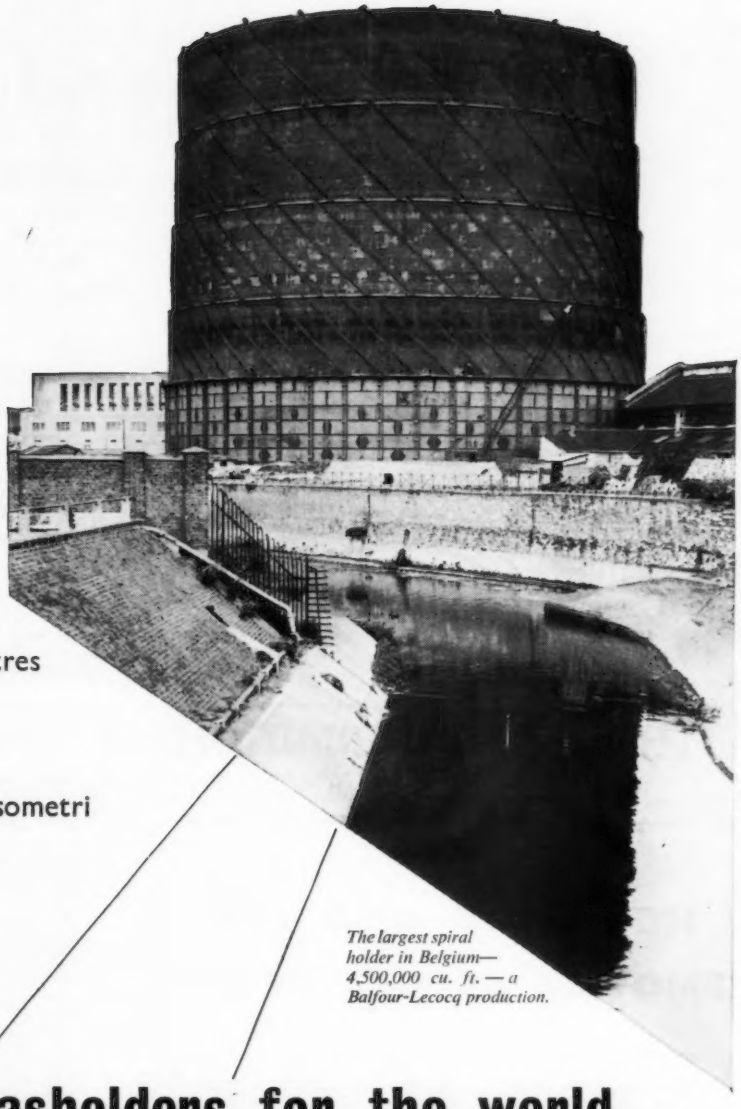

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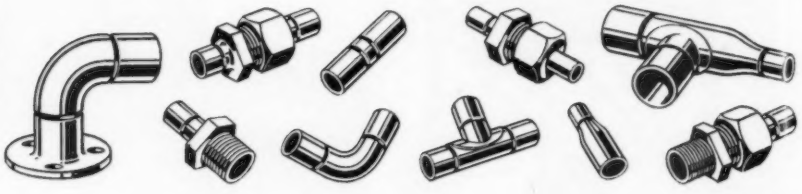

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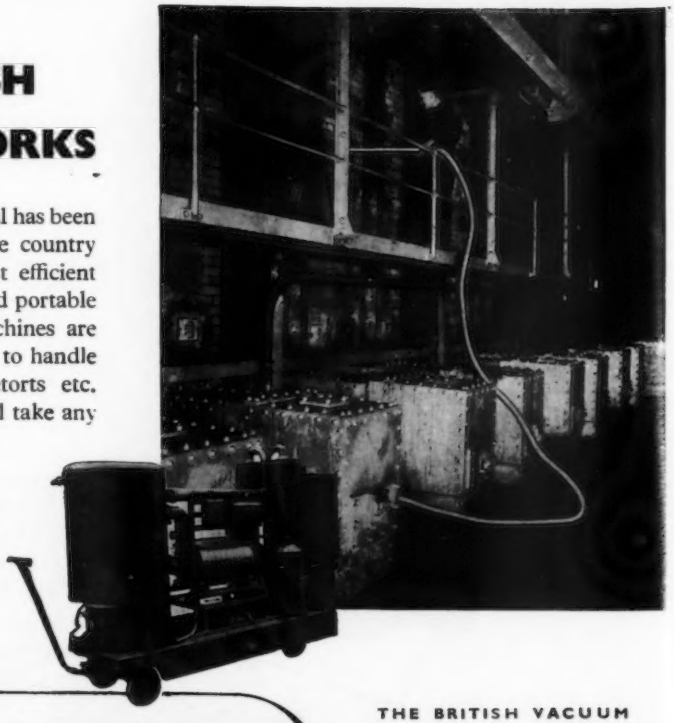
The illustration shows Redditch Gas works where a portable B.V.C. machine operates through an installed pipe system. Full particulars of these and other installations on request.



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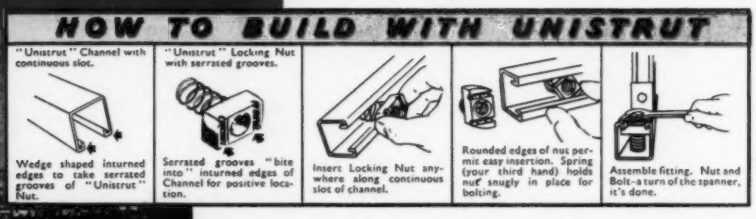
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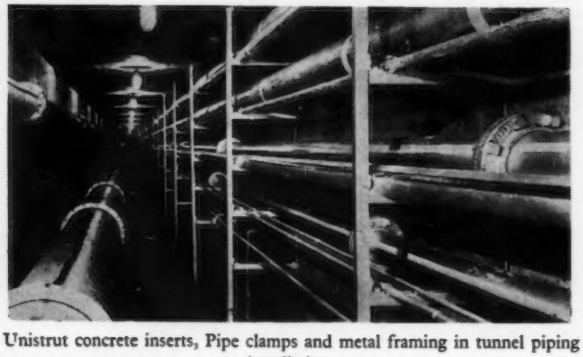

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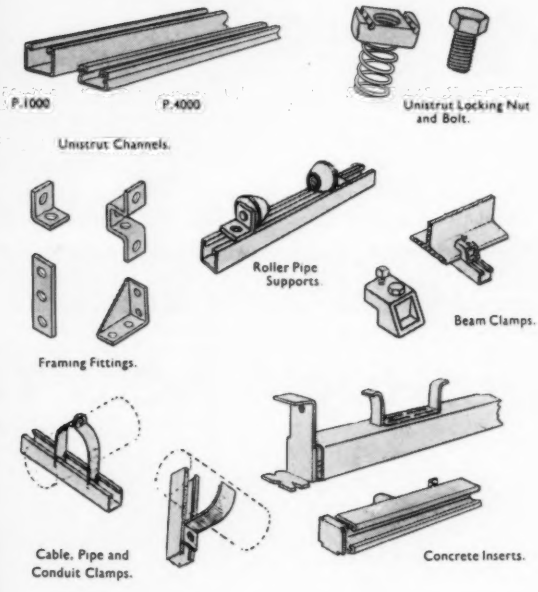

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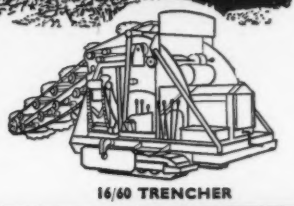

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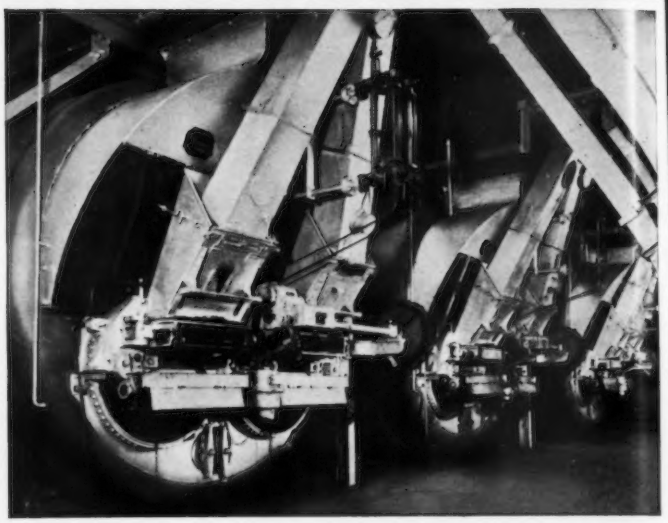

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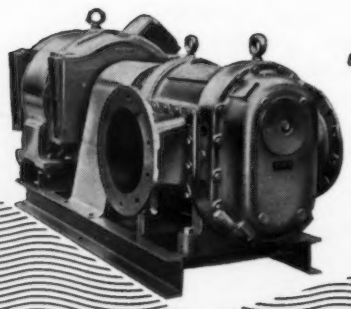

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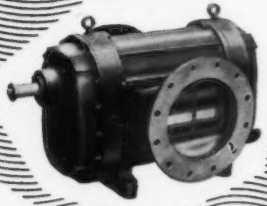

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A.S.E.F.—H.Q. Palermo, Tuesday—At 8.30 a.m. yesterday an all-out attack was launched on a heavy concentration of the enemy scale found skulking in many sectors of the city's gas mains. Directed by that veteran victor of scale wars, General Descaling, the offensive continued all day, while the townspeople of this ancient city went about their business unaware of the battle raging beneath their feet.

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OA/2189

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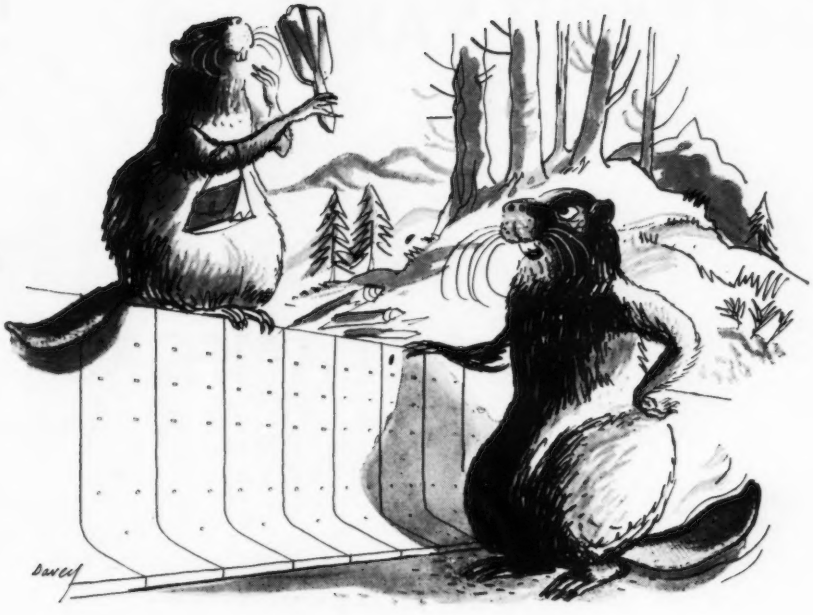
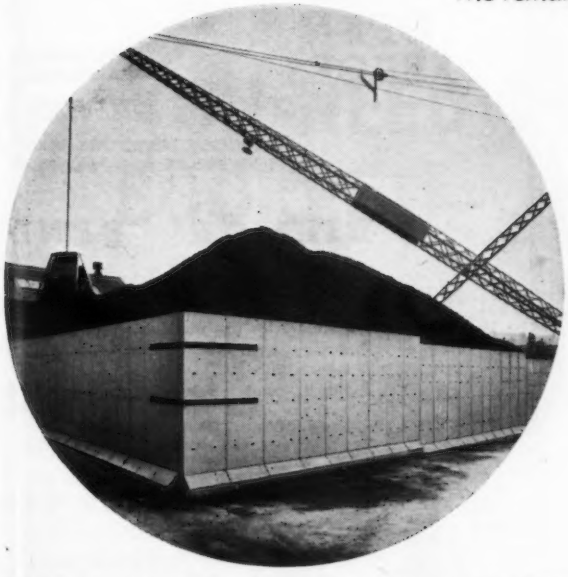
Brainy as a Beaver



"The beaver is noted," says the reference book; "for great intelligence, glossy fur and its skill in building dams." Beavers and businessmen both have storage problems on their hands. Industrialists who work like beavers are noted for their great intelligence and skill in using Stelcon units. The female industrialist has the glossy fur – usually mink!



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The illustration (left) shows a coal-storage installation at the Glasgow Glass works of Chance Brothers Limited.

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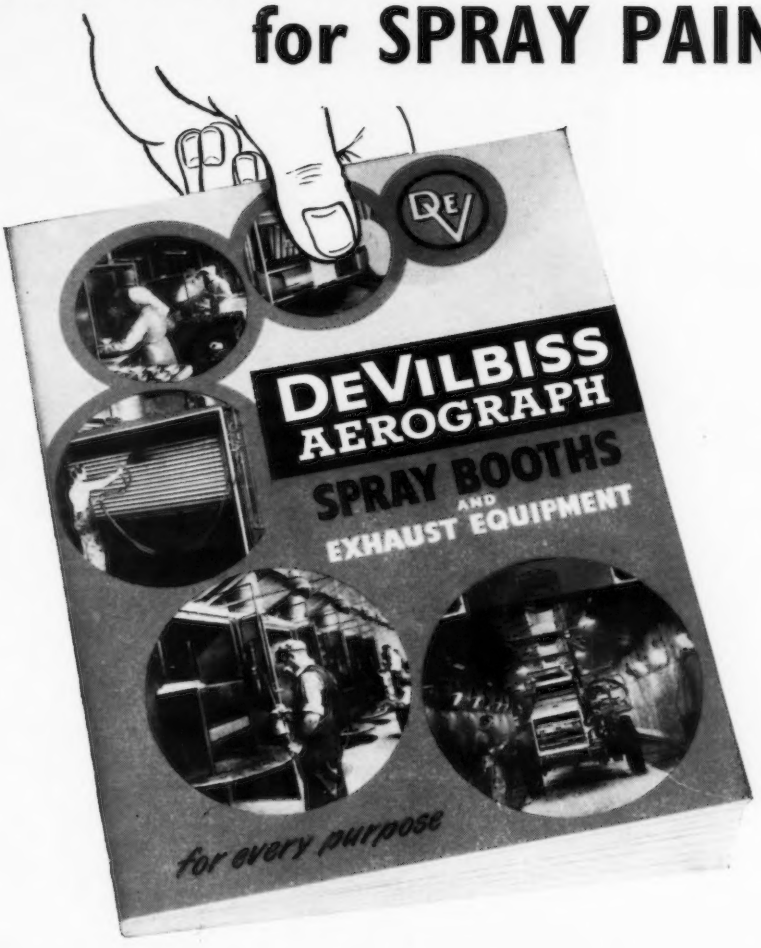

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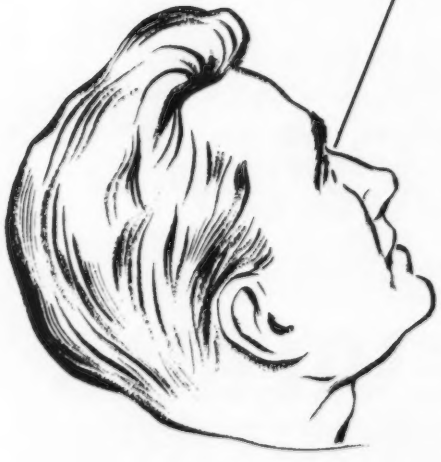

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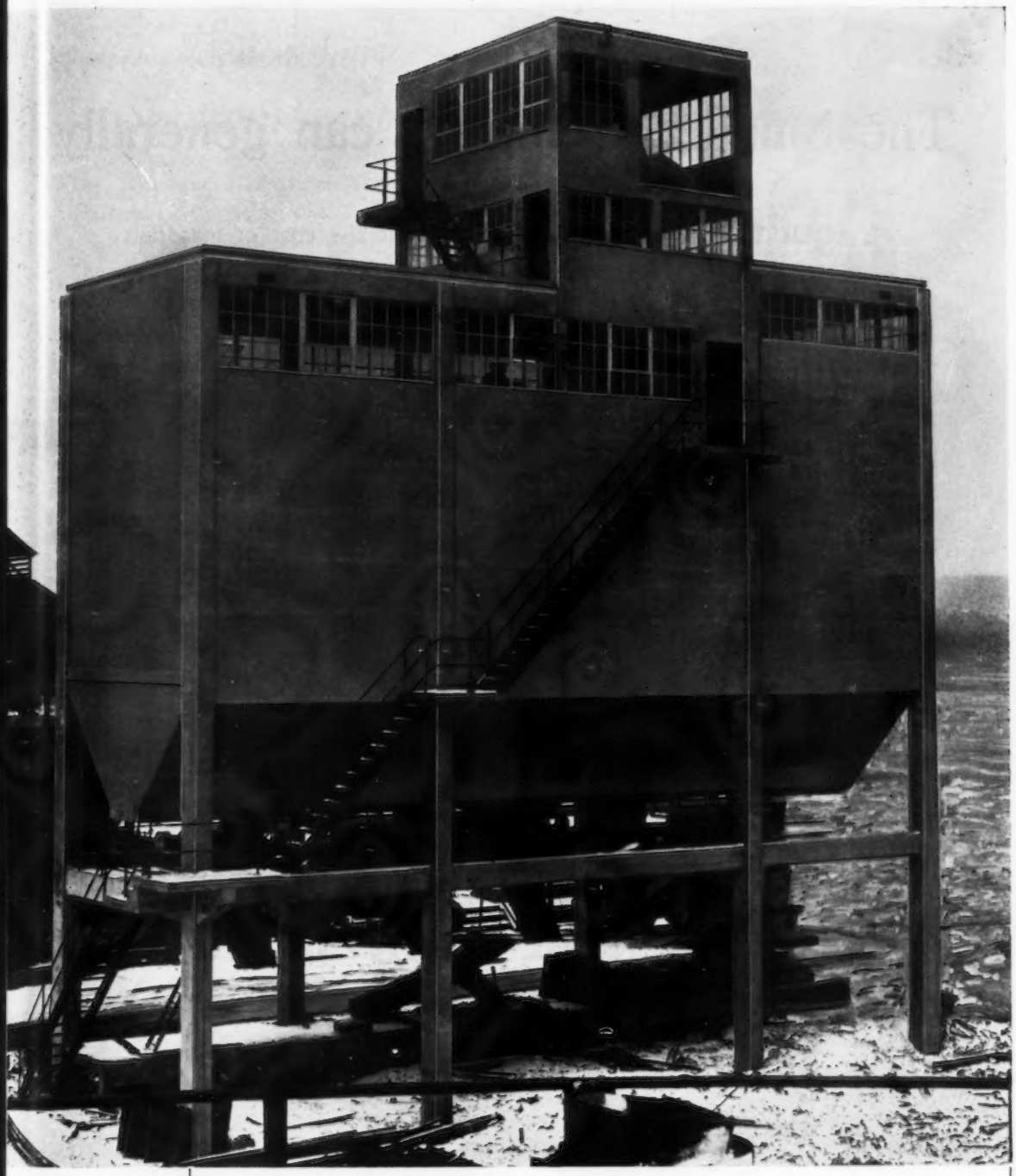

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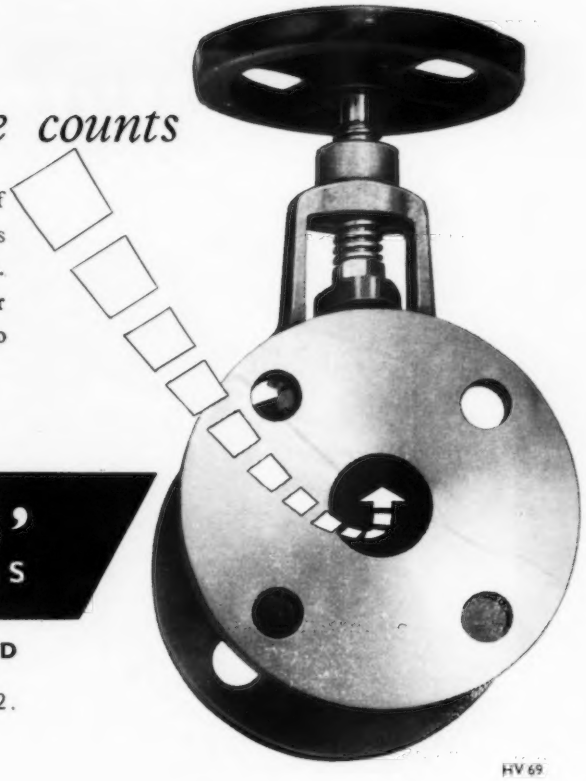

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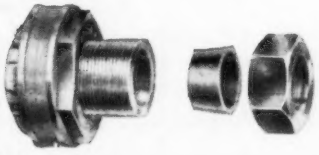

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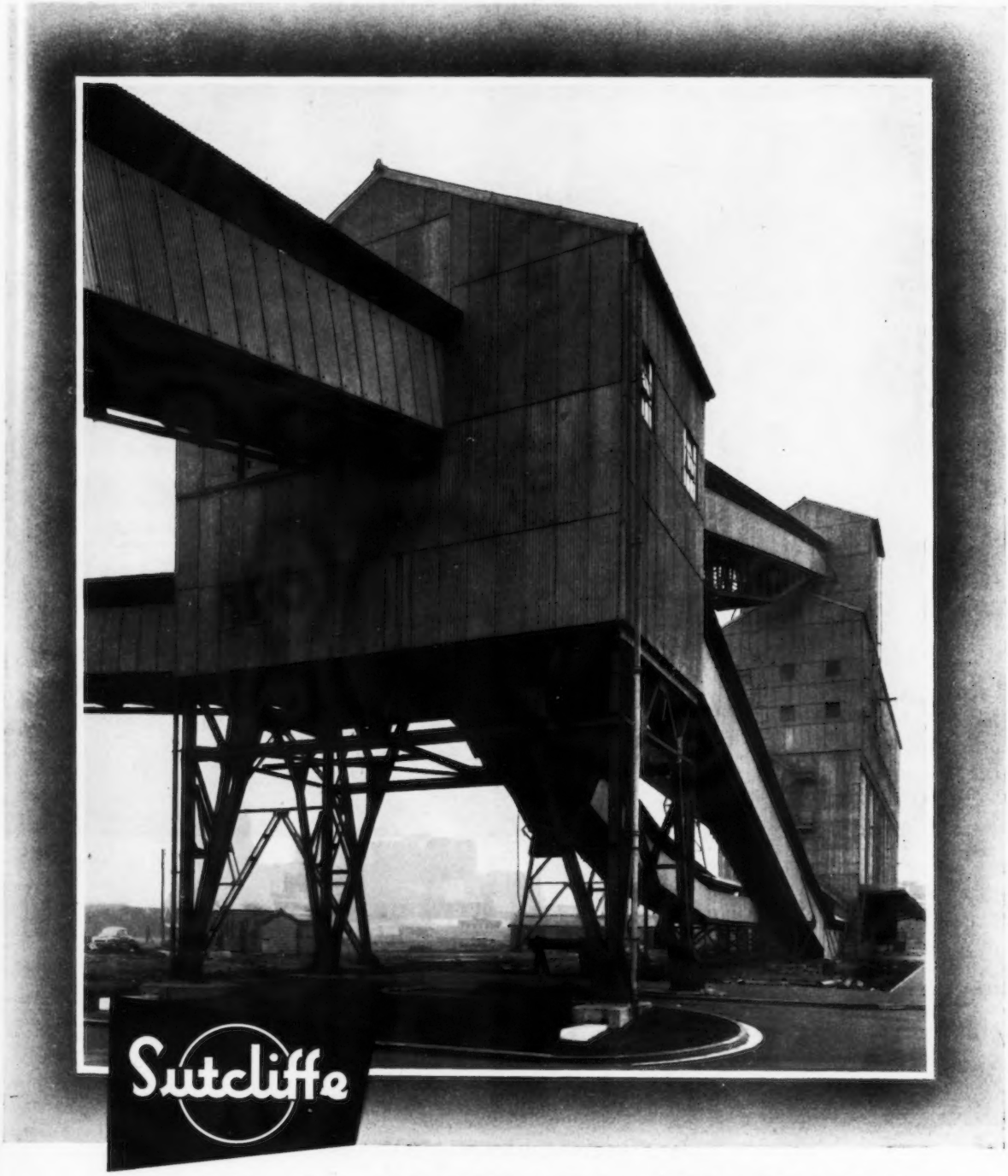

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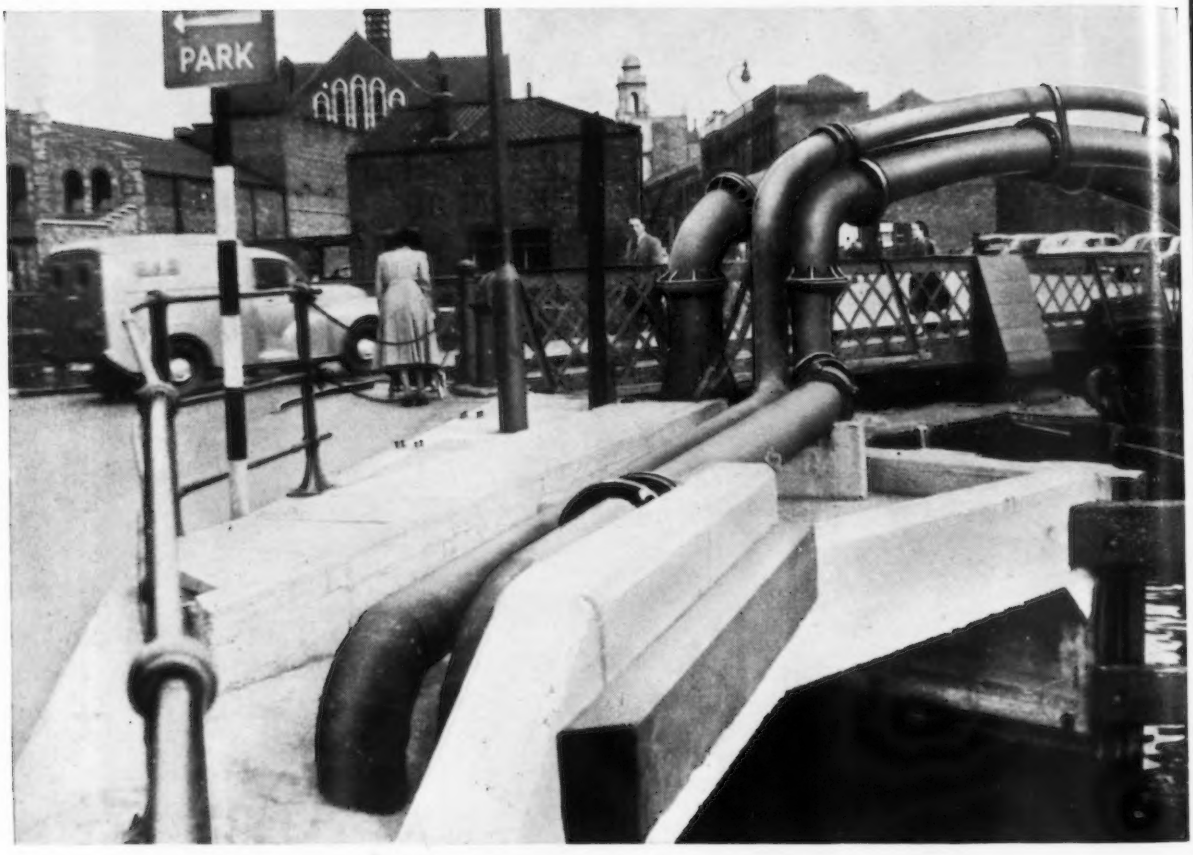

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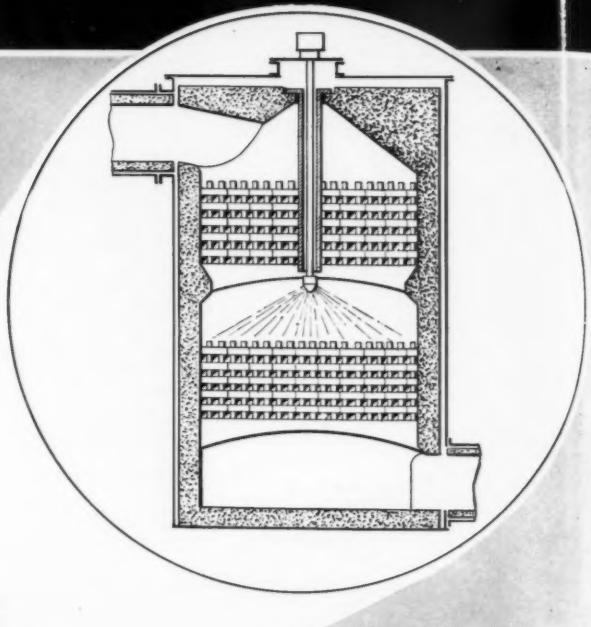

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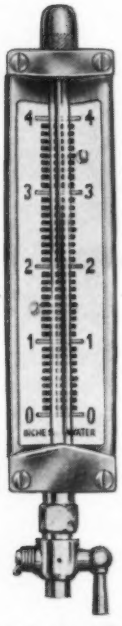

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Gas Journal

VOLUME 282. No. 4797. MAY 11, 1955. 107th YEAR

Skegness Conference in Retrospect

IT would be invidious, even if it were possible, either to say which of the area boards organizes the most successful staff conference or to pick out any one of a series of a single board's conferences as 'the best yet'. We have attended several, and we have yet to find one which does not amply repay all the labour and expense involved in its promotion; and, what is more significant, no board has kept strictly to the pattern of any other board's programme, a fact which in itself testifies to the wisdom of giving autonomy to the boards, with only top level liaison through the Gas Council. Some, perhaps, are better 'stage-managed' than others; some are more 'entertaining' and some have a more technical bias, but as a whole they are among the most pleasing of the developments which would never have come about but for nationalisation. We are prompted to these reflections by our recent visit to the sixth annual conference of the East Midlands Gas Board at Skegness, a report of which was published in the 'JOURNAL' last week. As year succeeds year it becomes just a little more difficult to introduce novelty into the programme without sacrificing anything of the fundamental purpose for which the members of the staff are called together. 'Skegness, 1955' will, however, be remembered for the addresses given by Mr. J. Latham, C.B.E., Financial Member of the National Coal Board, and Mr. C. R. King, C.B.E., Chairman of the East Midlands Electricity Board, on problems confronting their kindred industries. With commendable tact Mr. King dealt with competition between the gas and electricity industries and in wishing success to the East Midlands Gas Board he said he hoped they would never have anything but friendly feelings for their electricity competitors. 'So long as I occupy the position which I hold at the moment, I can assure you that you will never be able to accuse us of any unfair competition. But competition itself gives life to both our industries, and I hope it will survive despite the efforts of certain Members of Parliament who are always pressing the Minister of Fuel and Power to co-ordinate coal, gas, and electricity', Mr. King recalled old rivalries between gas and electricity in the lighting and motive power fields in which he thought it would be correct to say there was little or no competition today. The fight today is in the domestic field, and on the comparative merits of gas and electricity for cooking purposes, Mr. King confessed to a belief that gas cooking has certain advantages which electric cooking does not enjoy. 'I believe too that we have some advantages compared with you', he went on, 'but on balance and so long as our prices remain more or less what they are today, you will continue to get the lion's share of the domestic cooking business'.

The Skegness meeting was memorable also because of the presentation of papers on 'Occupational Health' by Dr. Norman Williams, who earlier in April had attained his first anniversary as the Board's Senior Medical Officer; on 'Marketing' by Mr. J. R. Knott, who took up his post as Marketing Officer to the Board in September, 1953, and on 'Organization and Methods' by Mr. W. Bestwick, Organization and Methods Officer, who entered on his duties in that office at the beginning of 1954. Only the largest gas companies before vesting date had their own full-time medical officers, and the work which Dr. Williams described was therefore quite a new development. Marketing and 'O. and M.' are old subjects in new clothes, requiring a new approach. All three papers provoked helpful discussion and, as usual at such conferences, led to even more useful conversation informally after the meeting. It was the first Skegness conference without the presence of Mr. Henry Jones, the first Chairman of the East Midlands Board, who was heavily engaged elsewhere on Gas Council business, but the Chairman and Deputy Chairman of the neighbouring West Midlands Gas Board were there, and the Ministry of Fuel and Power was well represented by Mr. Owen Francis, Under Secretary.

We have already published extracts from Mr. Sydney Smith's opening address, in which he said the fiscal year just finished was in many respects the most successful in the Board's history. He spoke of the continuing struggle to keep pace with rising costs beyond the Board's control, and gave some preliminary statistics about the sixth year's working results. Costs went up by about £1 mill. during the year, of which the Board absorbed roughly half by way of improved efficiencies, but Mr. Smith gave warning of the possibility of another gas price increase to meet further costs for wage and salary awards and other new demands. Mr. E. H. Harman, Deputy Chairman, devoted his opening address on the second day to a study of 'Coal—or Oil?' Opening addresses are not open to discussion, but there was much food for thought in Mr. Harman's analytical examination of future gas-making trends, in which he

quoted some salient points from the papers by Mr. G. le B. Diamond and Messrs. H. Stanier and J. B. McKean at the last autumn research meeting of the Institution of Gas Engineers. The problem before the East Midlands Board, and indeed before the industry generally, has many facets and it is certain that no one single solution exists, but so that East Midlands staff might view it in all its complexity he listed the pros and cons of new coal gas and new oil gas plants.

Holidays Essential

OCCUPATIONAL health has become one of the most important problems of modern industry. As we have already said, it was almost unheard of in the gas industry before nationalisation, except in comparatively few very large undertakings, but its importance has been recognized to the extent that 10 of the 12 area boards now have their own full-time medical officers and such staffs as they deem necessary to carry out the work of the medical department. Dr. Norman Williams told the Skegness conference that the development of medical services in industry falls into three fairly well defined stages. During the last century we saw the recognition of the value of medical examinations and an effort to control the worst toxic hazards of industry. The next phase was concerned with the recognition that the contentment and efficiency of the industrial worker was influenced by his working environment. We are now in the third, or pre-national occupational health service, stage. After reviewing facts and fallacies regarding physical and mental effort, Dr. Williams described the medical service now operating in the East Midlands Gas Board area, involving medical examinations, environmental hygiene, accident prevention, nursing service, and the very important matter of first aid.

In the past, doctors in industry have largely confined their attentions to the problems of the manual worker, but more recently there has been a growing realization that those holding positions of administrative responsibility are subject to their own particular occupational hazards. Not infrequently they are subjected to mental strain owing to the complexity of the organizations in which they work. The first symptoms of breakdown are not at all what the lay mind might expect. There is a phase of over-activity and it appears that the individual has become a 'glutton for work,' but this greater activity is not altogether purposeful. There is a loss of ability to reach decisions on major matters with a tendency to concentrate on details which could well be left to subordinates. To prevent the development of such a condition Dr. Williams advises that a regular annual holiday—about three weeks is the optimum period—should be taken. In his opinion the individual who keeps calling back at the office during his holiday period without some most urgent excuse is not only displaying the symptoms of an incipient mental breakdown, but is demonstrating a lack of confidence in his subordinates, or his inability to organize his department to function reasonably efficiently in his absence. No one is indispensable and we are all liable to sudden ills and accidents, so the good manager should see to it that subordinates are trained to be able to take over the reins at short notice. Unless this is done, how can the manager have that peace of mind so essential to recovery in the early phase of an acute illness or accident? If industry itself could devise methods to lighten the loads of those with heavy responsibilities then this hazard might largely disappear. Dr. Williams confessed that it was with some trepidation that he put these views before the conference, but he felt it his duty to draw attention to the hazard, the method of its recognition, preventive measures that could be adopted, and the course to be taken if overt symptoms developed.

Another part of Dr. Williams' paper which, to those of us who are beginning to feel the advance of years, seemed to touch a tender spot was his reference to the problems of our ageing population. Two factors are responsible for the increasing proportion of old people—the birth rate has fallen, and the expectation of life has increased considerably. One of the social functions of industry is the continued employment of persons past 'retiring age', a phrase that has developed almost mystical sanctity. Not that such a step would be a one-sided bargain. The older worker has a steadying influence on his younger colleagues; usually he has less short sickness absences; he is often more conscientious than the younger worker; and he may be the possessor of skills acquired during a lifetime of experience. There are two aspects concerning the employment of elderly people in which the doctor can be of assistance—the general one in which advice can be given as to what work they can be expected to do, and the individual problems of aged employees. Dr. Williams thinks the inactivity of retirement breeds an unhealthy introspective attitude of mind, with aggravation of the symptoms from the original condition. Work would prevent much of this, with benefit to employee, industry, and community. Throughout the country 3% of workers are over 65; in the organization of the East Midlands Gas Board only 2% are in that category. Dr. Williams is certainly doing a good job of work and one of the aims of his paper was to enlist the co-operation of his lay colleagues in establishing a service at least as good as can be found elsewhere.

The Battle of Costs

FEW people will be shocked to hear of the decision of the North Thames Gas Board to increase the flat rate price of gas from June 1. Many people in the gas industry have watched the Board's figures with bated breath these past three years (the price was pegged in February, 1952) and their wonderment has grown that the 'peg' has not come unstuck as the two major guy-ropes gradually dried out in the form of increased coal prices and an increased wages bill.

At it is, the increased costs of £3,297,000 per annum will not be met by the £2,800,000 the increase is expected to bring. Only economies by the North Thames Gas Board should, to quote Mr. Michael Milne-Watson, the Chairman, enable the Board to make ends meet *at present costs*. We emphasize those words because another black cloud is on the horizon. It is generally accepted that we will probably have to pay more for our carbonizing coal this year. When that happens the Board, 'could not absorb the cost of it and would be forced to pass it on to the consumer.' But, inevitable as the imposition of another, quickly following charge

appears to be, the Board is powerless to do anything about it. A member of the North Thames Gas Consultative Council suggested, at the making of the announcement, that if another increase was so imminent, the present price adjustment should be made higher. To which Mr. Milne-Watson pointed out that he would do so by all means—if they knew by how much the coal price would be increased. A wrong guess could mean the putting into the Board's pockets of a surplus million or so. And so the battle goes on—the battle with only a flimsy barricade against the tide of inflation. No one can accuse the industry of not manning the barricade to the best of its ability. Before the war, the Gas Light and Coke Company sold gas at 12.25d. a therm; for the past three years of high prices, the North Thames Gas Board has been selling gas at only 56% above that figure—at 19.1d. per therm. Compare that, say, with the relative cost percentages of an ordinary made-to-measure suit, then and now. For another example, let us take the typical struggle of the South Eastern Gas Board. When it presented its annual accounts last year, we were told that, in the five years since nationalisation, increases in price of raw materials, particularly coal, and increases in wages, salaries and other costs generally, amounted to nearly 6d. a therm. Up to March 31, 1954, the increase in the price of gas came to only about 2½d. a therm. Such figures reveal back-breaking work towards economies and improvements in working.

How far, logically, can these economies and improvements go? Economy is only relative to what one has to economize on, so there is little to assess there. But improvements in working—development in new processes and so on—are never-ending. What are the glimmers of hope? An important development is the Rochdale process which is producing striking results for the North Western Board; the use of alternative fuels, notably oil, is also being developed, and so may be the use of natural gas, either from drillings in this country or (dare we say it?) imported from abroad. We put the first two in that order because the Rochdale process of accelerated carbonization is the most likely to be of widespread benefit within a short time; oil gasification is not only still in the development stage but, as Mr. Milne-Watson said, we are hoping to increase its use 'as and when coal prices itself out of the gas-making market.' We are optimistic enough to hope for a little grace before that happens.

COKE CONSUMER SATISFACTION

LAST week we gave further thought to the relationship existing between gas and coke prices and the way in which the gas industry must face up to the requirements of a new, truly two-fuel policy. Availability of coke and its price are two of the three essential points governing domestic coke usage, the third being the need to ensure consumer satisfaction. It is here that we are dependent, to a large extent, on the public relations and technical abilities of our salesmen and representatives. As a result of recently introduced Gas Council policy, all salesmen in the industry are to be trained in coke, as well as gas, utilization. This decision will have far-reaching results, because salesmen will no longer be able to pretend that their business is gas, and that coke is really nothing to do with them, and even more significant, salesmen will no longer be permitted openly to criticize coke. This disloyalty was by no means uncommon and even today there are a number of people closely associated with the selling side of the industry who make no secret of their lack of faith in coke. Such an attitude is not conducive to increased coke sales. Faith in the product is of great importance to any salesman, and since lack of faith is often the result of ignorance, it follows that the creation of proper information services are a first step towards rectifying the situation. Sections of the public cherish similar prejudices; how are they to be converted if the missionaries themselves lack faith?

From this it is clear that the industry must face up to the task of keeping its sales force fully informed of developments in the field of coke and coke-burning appliances. Recognizing this need, our sister publication 'GAS SERVICE' has 'suffered a sea change' and appeared this month in a new guise. Under the new title 'GAS SERVICE AND DOMESTIC COKE', and resplendent in a striking new cover, it carries a 12-page Domestic Coke Supplement containing news of the latest appliances and various aspects of coke utilization. It has always been acknowledged that this journal is read by sales staff throughout all the area boards. Here surely is the ideal medium for making coke the gas salesman's business and helping to keep him informed of the significant changes being made as there emerges the pattern of a smokeless Britain.

INTERNATIONAL GAS UNION

The Council of the International Gas Union met in Stockholm on April 18 and 19. The business sessions were presided over by Mr. R. W. Hendee, President, assisted by Mr. R. H. Touwaide, Secretary General. The delegates of the national organizations of Austria, Belgium, Denmark, France, Germany, Great Britain, Italy, Netherlands, Norway, Saar, Sweden, Switzerland, and the United States were present, as well as Mr. A. Baril, Hon. President, and Dr. W. T. K. Braunholtz, Hon. General Secretary. Mr. Bengt M. Nilsson, President of the Swedish Gas Association, welcomed the members of the Council.

It was decided to publish, for discussion at the 6th International Gas Conference in New York, the report of the International Committee for the Harmonization of Essential Clauses in the Specifications for Stamping of Gas Appliances. The Chairman of that Committee agreed to accept for inclusion in the report a short statement, to be submitted by the British delegates, on the present position in regard to new British Standards for domestic gas appliances.

The work done by the international committee for the development of gas utilization and the dictionary panel was considered. At the request of the German delegates, it was agreed to set up a small exploratory committee on the terminology of gas industry statistics.

The arrangements for the 6th International Gas Conference, to be held in New York from September 25 to 30, were detailed by the President. The Council considered proposals for the election of a President and seven Vice-Presidents for the period 1955-1958. At the President's request, the Secretary General explained the consultative status which had been granted to the I.G.U. by the United Nations Organization. The Council also considered further suggestions for the international exchange of young gas engineers.

The Council received and considered a report of the provisional programme of the 5th World Power Conference in Vienna in June, 1956. It was agreed that national gas organizations should endeavour to arrange for the presentation of papers on gas subjects at the Vienna Conference, and that a short report on international collaboration in technical matters concerning the gas industry should be submitted by the International Gas Union itself.

After the business sessions, the members were received by the civic authorities of Stockholm in the Town Hall, where they were entertained to luncheon. They also visited the Stockholm gasworks, the ancient cottages at Skansen, and the town of Stockholm, and enjoyed the hospitality of the Swedish Gas Association at a dinner and theatrical performance.

Correspondence

ATOMIC ENERGY AND THE GAS INDUSTRY

DEAR SIR,—The announcements in recent months of the ambitious programmes for the production of electricity from nuclear energy have aroused a great deal of interest and have earned just applause for the initiative of the Central Electricity Authority. This, of course, is as it should be and the gas engineer will wish to be associated with the congratulations passed to the opposite number in one of the complementary utilities. There has surely been time, however, for at least a mild protest to be voiced by the gas industry on the way in which the new source of energy is to be restricted to a single outlet and, unless this omission is rectified soon, we shall have no one but ourselves to blame for being relegated to an unwarrantedly junior position, both nationally and internationally.

It has been assumed so far that the sole application for the heat generated in the piles will be steam raising for the production of electrical power and while it could be questioned whether this should remain so indefinitely, few would deny the convenience of the process in 1955. It does *not* necessarily follow, however, that sole distribution should be in this form and surely, on any sizeable scale, it would be folly to permit such single mindedness. Electricity, as such, cannot be stored and so the generating station must be designed for the worst peak conditions which can be expected during the useful life of the equipment. It will, therefore, be badly over-rated and will work for most of its life at poor efficiency and an unduly high cost per unit generated. We have been told by Sir Christopher Hinton that amortisation costs will be roughly double fuel costs and with advances in the techniques of extraction metallurgy it would seem reasonable to assume that this proportion will increase. For economic reasons, therefore, if for no other, conversion of the electricity generated off peak into a latent form must be considered the first step in reducing the nation's fuel bill.

There are, of course, a number of ways in which this may be done theoretically but the only method which will permit the quantities involved to be converted into a storable product, capable of easy transmission and usable in uncharged form by some millions of existing energy consuming devices, is the production of hydrogen by the electrolysis of water. This simple process, which can be operated at a high watt efficiency provides a product which can be stored, blended with one of our main present fuels, used for the modification and benefication of many solid and liquid fuels of poor grade and, at a pinch, re-used for the generation of electricity. It has recently been stated by W. J. Idris Jones that hydrogenation of coal would not be considered except in the direst national emergency. Would this view still prevail if hydrogen were to be made available *ad lib*? Electrolytic hydrogen is of course not only the purest of fuels but a raw chemical of extreme usefulness and by virtue of being made available for the first time in history at a reasonable cost could simplify and cheapen many industrial processes ranging from the production of margarine to the reduction of metallic ores.

Apart from the greater suitability of gas for many applications, perhaps the most important aspect however is the immediate decentralization and local storage of energy which can be effected. It is not unthinkable that the future will see us relying to a very great extent indeed upon nuclear energy for all our wants and if this should be produced solely in the form of electrical energy then the incapacitation of one of the few vulnerable sources of generation even for a brief period could halt a large section of the nation completely. There are a hundred and one reasons why the gas industry should not and in fact must not be neglected at the present moment and if increasingly poor carbonizing quality of available coal makes some of these self interested, they are none the less valid for that. What then is going to be done and how long must we wait for the first steps to be taken?

Yours, etc.,

'KLAPROTH.'

May 9, 1955.

Personal

MR. J. B. FULLOWAY and MR. J. W. SAXON have been appointed sales representatives of Morley Products (Padiham), Ltd. Mr. Fulloway joined the Droitwich Corporation Gas Department in 1938, later becoming a Technical Assistant to the Engineer and Manager. He served for four and a half years with the Anti-Aircraft Command and on return to Droitwich was appointed Showroom Manager, and more recently has been in charge of the Worcester Showrooms of the West Midlands Gas Board. He is a member of the Midland Junior Gas Association, and was formerly Secre-

tary of the Worcester/Herefordshire Divisional Sales and Service Circle. Mr. Saxon commenced his career in the gas industry in 1939, and served with the R.A.F. from 1941 to 1946. On his return to the industry he was later appointed Showroom Manager, Nelson, eventually becoming Senior Salesman, Nelson District, North Western Gas Board. We understand that in the 1952 examination of the Institution of Gas Engineers he was the only candidate outside the Metropolitan area to get a first class Certificate in Salesmanship and Consumer Service.

MR. ERIC K. GAINES has been appointed by G. L. Howarth & Co., Ltd., Nelson Square, Burnley, to represent them in the North Eastern and Northern Gas Board areas.

MR. W. J. BURTON has been appointed Assistant to Mr. J. I. Willis, who is Deputy Director-General of the Marketing (Sales) Department of the National Coal Board at Hobart House. Before his appointment, Mr. Burton was Manager of the London and Southern Sales Region of the National Coal Board.

Obituary

MR. R. J. PARKER, who held many important positions with George Kent, Ltd., and of recent years was Manager of their spares and repairs department, died on May 1. He had been a member of the Company since 1907.

Diary

May 14.—LONDON JUNIORS: Visit to Portslade works, Brighton.

May 16.—WEST MIDLANDS G.C.C.: Gas Offices, Edmund Street, Birmingham, 2.30 p.m.

May 16.—EASTERN G.C.C.: Connaught Rooms, W.C.2. 2 p.m.

May 17.—LONDON AND SOUTHERN SECTION, I.G.E.: Spring Meeting. Annual Luncheon and Chairman's address.

May 19.—MANCHESTER JUNIORS: Visit to A. V. Roe & Co., Ltd., Woodford Works. 'Complete Gasification', Hartill, Spencer, and Wheatman.

May 20.—WALES G.C.C.: County Hall, Llandrindod Wells, 2 p.m.

May 21.—SCOTTISH JUNIORS (EASTERN): Golf Outing. Lundin Links.

May 23.—NORTH EASTERN G.C.C.: Leeds.

May 24-27.—INSTITUTION OF GAS ENGINEERS: 92nd Annual General Meeting, Portsmouth. For full programme see 'JOURNAL," April 27, p. 235.

May 27.—LONDON JUNIORS: Business meeting. Allan Taylor film. 178, Edgware Road, London, W.2. 6.30 p.m.

June 2.—SOUTH WESTERN G.C.C.: 34, Bridge Street, Taunton, 11 a.m.

June 4.—SCOTTISH JUNIORS (EASTERN): Annual Outing. Edinburgh. Visit to Granton works in morning.

June 7.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, 2.15 p.m.

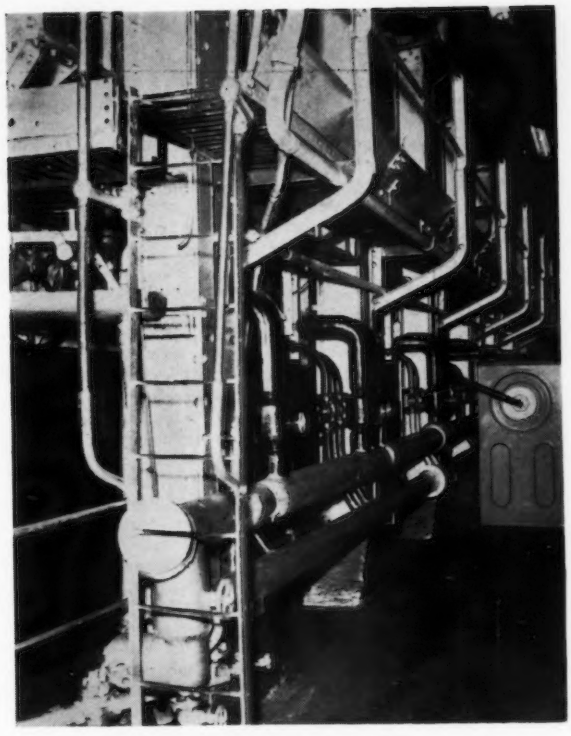
June 8.—MANCHESTER JUNIORS: Visit to Newton Chambers, Thorncliffe.

Large Scale Carrier Gas Carbonization in the North Thames Area

By A. F. GRANT, M.Inst.Gas E.†

AND

C. H. LEWIS, M.Inst.Gas E.§



Carrier-gas installation at Bow Common works

THE North Thames Gas Board became interested in the 'carrier gas' process in the summer of 1953, when representatives of the Board were invited by Wests' Gas Improvement Company, to visit their research plant at Manchester to discuss experiments being carried out by that Company on the process. From the information then disclosed, and later published by Gaskill, it appeared that by the injection of between 5,000 and 6,000 cu.ft. of a 'carrier' gas per ton of coal carbonized, the throughput of a continuous vertical retort could be increased by about 50% above that normally obtained under conditions of minimum steaming.

Some preliminary trials were therefore carried out at the Board's Kensal Green works, while arrangements for full scale experiments on a complete bench of retorts at Bow Common were being made. The Kensal Green trials were carried out in two Woodall-Duckham 82 in. retorts. No facilities were available for weighing the coal charged to the experimental retorts, but by the injection of 2,500 cu.ft. per hour of either producer gas or district gas it was found that the normal throughput of 7 tons of mixed R.O.M. Durham coal per day could be increased to about 10 tons per day as estimated from the indicators on the coal boxes. The rate of gas injection was equivalent to approximately 6,000 cu.ft. per ton of coal carbonized, which was in agreement with the data supplied by Wests' Gas Improvement Company, but was appreciably less than reported by Nicklin and Redman in March, 1954. Increasing the rate of carrier gas injection at Kensal Green to 4,500 cu.ft. per hour did not permit a further increase in throughput, and it was concluded that for Durham run-of-mine coal carbonized in the Kensal Green retorts the upper limit of throughput was of the order of 10 tons per day, and a carrier gas injection rate of about 2,500 cu.ft. per hour (equal to 6,000 cu.ft. per ton of coal) was sufficient for this throughput.

A second series of experiments was then carried out using Ormonde (Type 702) coal. It was thought possible that the increased rate of carbonization resulting from carrier gas injection might improve the caking properties of the coal, but there appeared to be little advantage in the process from this point of view, since there was no significant difference in either the grading analysis or shatter test strength between the coke produced from Ormonde coal with normal steaming and that made by carrier gas injection.

The carbonizing plant at Bow Common consists of two benches of Woodall-Duckham retorts, and one of these benches was shut down for repairs. The remaining bench provided the necessary facilities for quantitative trials of the process, with adequate plant for purifying and metering the gas produced. No special steps were taken to condition the bench for the process, and at the commencement of the work the retorts had operated continuously for 1,310 days since the previous re-set.

A time limit was imposed on the experimental period by the necessity to bring in the second bench for gasmaking to meet the winter demand. In the time available the process was operated under different sets of conditions in relatively short test periods. While it is not claimed that optimum conditions were obtained for each test, sufficient data were collected to enable an effective appraisal of the results to be made in each case.

It will be noted that the declared calorific value of 500 B.Th.U. per cu.ft. has not been adhered to throughout, and variations from this calorific value were made to permit the maximum utilization of carrier gas over short periods. This obviously would not be practicable for permanent operation. The results serve to illustrate the effect of the process if it is to be operated with the normal proportion of coal gas and carburetted water gas plant installed on the Board's works.

Operating Equipment

No. 1 Bench at Bow Common consists of 34 82 in. W.D. retorts of standard shape. The minor axis is 10 in. at the top expanding to 18 in. at a depth of 18 ft., the lower section being parallel. The top ironwork is of an old design, the gas offtakes rising to the collecting main and being fitted with mushroom valves. The equipment installed was the minimum required for adequate functioning of the process. Fig. 1 shows the general layout of the system, and Fig. 2 gives details of the equipment for each retort.

Each of the 34 retorts was fitted with a 2 in. dia. carrier gas service which entered the bottom casting where steam is normally admitted. A tee connection at this point enabled normal steaming to be resumed as necessary, and this arrange-

* From a paper to the London and Southern Section of the Institution of Gas Engineers on April 19, 1955.
† Station Engineer, Bow Common.
§ Research Chemist, Fulham.

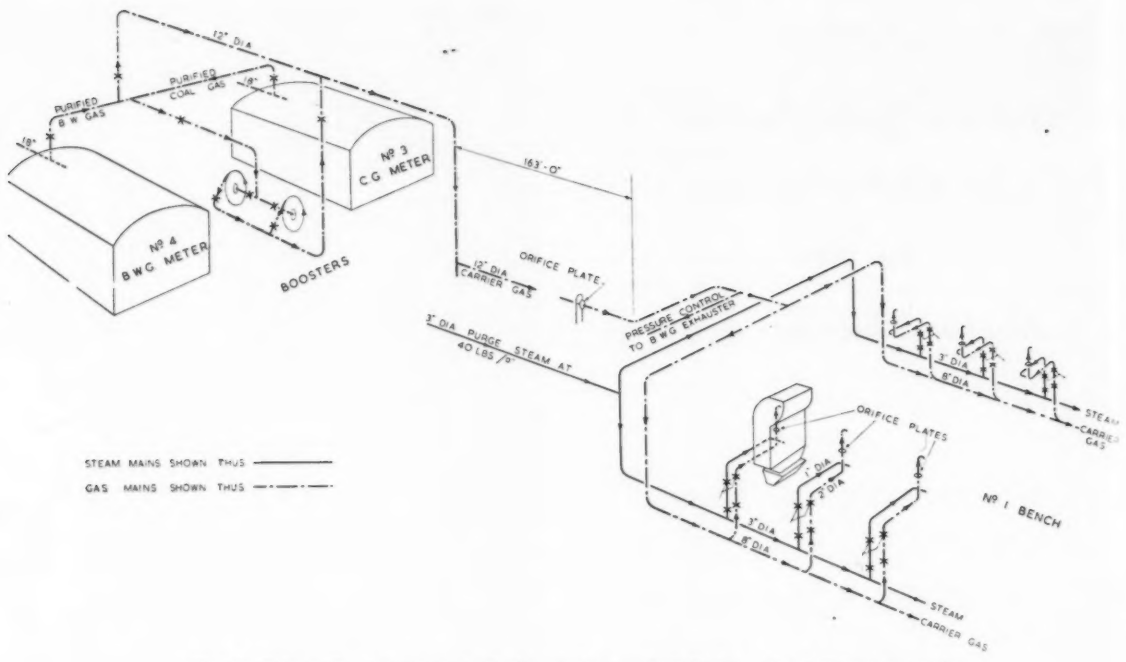


Fig. 1. Schematic arrangement of the carrier gas installation at Bow Common works

ment facilitated the modified technique for standing retorts off for scurfing and subsequently putting them back to work as detailed later. A 1 in. dia. steam purge service was fitted to the taper section of the coke box just above the discharger assembly. These two services for all retorts were supplied from manifolds running along each side of the bench. Each service was fitted with an isolating valve which, in the case of the carrier gas service, also served as a control valve for the rate of supply of gas to the retort. The operating valves on each service were simply interlocked with each other and with the discharger wheel to ensure the cessation of gas supply to the retort and purging with steam before coke discharge could commence. No timing device was fitted, purging being left in the control of the operators. In practice this was found to be satisfactory but, as a precautionary measure, the steam pressure on the purge line was kept at some 40 lb. per sq. in. under which pressure a 30 seconds purge was adequate.

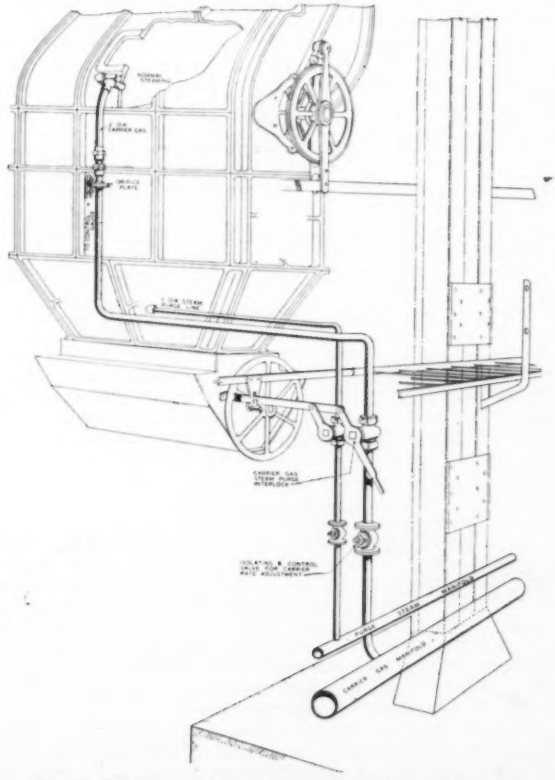


Fig. 2. Detail of the equipment applied to each retort

The carrier gas manifolds were fed by a common main from the outlet of either or both of two wet drum meters, one dealing with recycled coal gas and one with water gas. As a check on the meter records and for conditions which required the bypassing of the meters, an orifice flow meter was provided in the common main. For high rates of carrier gas injection low pressure boosters were installed as shown in Fig. 1.

When using blue water gas as carrier, the pressure in the retort house end of the common main was used to operate a governor controlling the steam supply to the blue water gas exhauster, to ensure steady pressure conditions and a constant feed of carrier gas to the retorts. When using coal gas as carrier, a steady pressure at outlet meters was available at all times since this was controlled by an inlet holder booster operating with a pilot governor on the inlet pressure to the booster. The combination of these two controls when using mixed gas injection was adequate to maintain steady pressure conditions in the system, the proportion of coal gas and blue water gas for injection being manually controlled by the appropriate valves on the inlet to the carrier gas boosters.

The equal distribution of carrier gas to all operating retorts at the desired rate was controlled by the orifice plates in the gas line to each retort; the required pressure across the orifice plates was set by adjustment of the isolating valve and measured by a single U-tube gauge across the orifice. It was found that, once set, the gas rate varied very little except during coke drawing periods as retorts were being discharged. Any variation in pressure in the retort bottom casting assembly due to the travel of the coal charge did not materially affect the rate of gas supply.

The major refinements for a permanent installation which would be required and could be provided at a reasonable cost are:—

(1) A simple governor valve in the main carrier gas supply line to maintain constant pressure in the manifolds.

(2) More robustly designed orifices and gauges in the retort gas line for use by the normal retort house operators.

(3) A timing device for the purge steam as a precaution against careless operation of the interlock system.

There are, however, certain disadvantages in this layout for permanent operation. All carrier gas was purified prior to metering, with the result that the residual oxygen from the purification air was combusted with gas in the retort. Further, the volumetric load on the wet and dry purification plants was increased by recycling purified gas. The approximate cost of supplying and installing the equipment was £650 or £185 per retort. The additional cost of two boosters would be some £1,600.

General Features of Carrier Gas Operation

Labour Force.

The manning of the bench for normal operation requires two rodders (top men), one man on coke discharge (bottom man) and 1½ firemen on producers (3 men for two benches) per shift. Since the primary functions of coal charging and coke extraction require to deal with some 50% increase in coal throughput on carrier gas operation, it was found necessary in practice to charge coal and discharge coke at twice the normal frequency for a satisfactory operating schedule to be established. This meant that the top and bottom personnel were doubled for coal charging half-hourly and coke extraction at hourly intervals.

Additional supervision would be necessary on a permanent installation. One foreman per shift is employed for the two benches on normal steaming, but if these were both on carrier gas it is certain that he would require an assistant.

In most cases it would not be necessary to increase firemen to deal with the additional load on the producers, nor would scurfing personnel need to be increased. The problem of retort bottom leakage would require the doubling, at least, of retort repair personnel to maintain retorts in effective operation.

Operating Methods.

When using carrier gas the bench was operated from shift to shift by the normal retort house personnel. The desired conditions for a given test run, i.e., coal throughput and carrier gas rate per retort, were set by the retort house engineer and the research staff. Setting heats were adjusted and maintained in co-operation with the daywork carbonizing foreman and the normal heats control personnel. When these conditions had been established the day-to-day control of the bench was left in the hands of the usual operators. The research staff was primarily responsible for observation and recording of test data, and for supervising control of the rate of gas injection to each retort. The normal works staff of shift superintendents was required to give additional supervision to the bench, particularly in out-of-daywork hours, dealing especially with troublesome retorts.

The introduction of the normal steaming nozzle into the carrier gas line to each retort facilitated the changeover from normal to carrier gas operation. Indeed, with advancing heats, it was possible to increase coal throughput rapidly after the application of carrier gas without interference with the travel of the coal charge.

Details of Experimental Work

Tests results are summarized in Table I. For reasons given later it was necessary to operate some retorts on normal steaming and others had to be left empty for periods. No attempt has been made to segregate gas made by the carrier process from that made by normal steaming retorts. In order to give a more accurate representation of the carrier gas operation in each case, however, the throughput of coal, volume of gas injected per ton of coal and thermal output per retort have been estimated for the carrier gas retorts only. These estimates are substantially correct, being based on detailed data for retort operating hours and extractor settings.

As has been stated, the period available for the experimental work was sub-divided to enable the process to be investigated under several sets of conditions. These were:—(1) blue water gas as carrier; (2) coal gas as carrier; (3) mixed gas as carrier; (4) carrier gas operation at normal coal throughput with appropriate reduced setting temperatures.

The transfer from normal operation at the commencement of the experiment was made in batches of retorts over a period of six days, the coal throughput and carrier gas rate being set on the basis of the operational data from the Kensal Green trials. Four days were allowed subsequently for setting heats, coal travel, etc., to be adjusted to steady conditions for the first week's test run with blue water gas injection.

(1) *Blue Water Gas Injection.*

Four separate one-week tests were carried out with blue water gas injection. For the first week an average coal throughput of 12.05 tons per retort per day was operated with a gas injection rate of 2,200 cu.ft. per hour or 4,389 cu.ft. per ton of coal. No major change was made in the 3rd and 6th pass temperatures but the 1st pass was raised some 20°C.

Under these conditions it was found difficult to obtain a clean coke discharge. Fine coal was present in the breeze and intermittently, lumps of coal were discharged practically unaffected by heat. The discharge was not smoky, the coke produced appearing to be reasonably well burnt off. This continued practically throughout the four weeks' test, and and was a major factor in limiting the coal throughput. Increasing the carrier gas rate to 5,200 cu.ft. per ton of coal effected no real improvement and this carrier rate in turn was limited by total availability of blue water gas from the carburetted water gas plant and the calorific value of the mixed gas. The average calorific value of the mixed gas produced during the four weeks was only 492.5 B.Th.U. per cu.ft., although the calculated calorific value of the neat coal gas at the retort-house governor was as high as could be anticipated. It was necessary to correct the low calorific value of the district gas by producing gas at a higher value during the remainder of the quarter, so that operation under these conditions could not be continued indefinitely. The average coal throughput of some 12 tons per retort per day for the retorts on carrier gas was in fact excessive for the rate of carrier gas injection employed since carbonization was far from complete. Any attempt to increase the carrier gas to coal ratio would have involved a further reduction in calorific value, which could not be tolerated; in this connection it may be noted that high coal throughputs can be obtained only by the use of coal gas as the carrier for a final calorific value of not less than 500 B.Th.U. per cu.ft.

The normal throughput of coal at Bow Common when producing gas at a calorific value of 512 B.Th.U. per cu.ft. is 8.9 tons per retort per day, and a throughput of 9.3 tons per day can be attained producing 535 B.Th.U. gas. The throughput of 11.78 tons per retort per day thus represents an increase of 32%, but this throughput could not be maintained while producing 500 B.Th.U. gas.

Although there was no serious trouble with hanging charges, it was clear that there was some channeling of coal through the retort caused by variations in size and quality of coal. The normal supply of coals to the station comprises some twelve to fifteen grades of South Yorkshire and Midland coals with swelling numbers between 3½ and 7. Moreover, these coals range from graded peas, singles and doubles to unscreened over 3 in. In the latter category, a high proportion of lumps some 15 in. by 12 in. by 12 in. are supplied which, when passed through the existing crushers, result in a considerable content of pieces of the order of 5 in. by 4 in. by 3 in. fed to the retort.

Arrangements were made, therefore, to limit the size of coal for further tests to 2 in. to 0, a step which might not be economical or practicable as a permanent arrangement in the London area on any large scale. This limitation of size did not become effective until the later tests and it then also resulted beneficially in the reduction of the number of different coals to about six.

Under normal steaming conditions with the normal range of coals there is a tendency to a considerable variation in the calorific value of the gas produced throughout the 24 hours, due to the variations in mixtures of coals over this period and to segregation in the bunkers. This effect was more pronounced with carrier gas operation, the variation being some 30 B.Th.U. per cu.ft. In order to exercise some measure of control of calorific value it ultimately became necessary to adjust the driving speed of the extractor gear in accordance with the calorific value of the gas produced.

Rodding conditions at the top of the retorts throughout the blue water gas test were little different from normal and, with an ample producer capacity, the increase in producer gas demand resulted in no noticeable accumulation of clinker.

The second major problem which became evident, and was to become more serious at later stages, was the leakage of gas into the air ducts round the main floor joists through the bottom section of firebrick. There was also leakage from the metal-to-metal joints of the bottom seating casting and coke box assembly into the lower air duct. While the leakage could be attributed to age there is evidence to show that the temperature conditions in this zone of the retort are such that it is very difficult to obtain a cement that will ensure a satisfactory joint, and that similar leakage can occur in new installations.

Under the operating conditions normally employed, with the admission of 5% to 7% of steam and producing gas in the retort house at calorific values in excess of 500 B.Th.U., the retorts at Bow Common usually show a slight vacuum at the bottom. If, as a result of uneven travel, a small bottom pressure develops, steam possibly mixed with some low-grade gas passes into the air ducts. In extreme cases of bottom pressure, however, coal gas may pass into the air ducts, where it may ignite and cause serious local overheating of the floor joists. Uneven conditions of this nature may escape observation by the operating personnel, with the result that serious floor joist deflection can occur before evidence of this becomes visible.

In the light of this evidence, it has been decided to insert during the re-setting of the bench in 1956 in the floor joist air cooling ducts, pre-fabricated steel sleeves between the joist web and the rear face of the brickwork. While this will localize the leakage and prevent direct flame impingement on the joists it still leaves to be solved the problem of ensuring gas tightness in this zone of the vertical retort.

With carrier gas injection, however, as long as there is any pressure at the base of the retorts gas may leak into the air ducts, and in one instance where a charge was travelling very unevenly, creating excessive bottom pressure, combustion in the air duct was so severe as lead to a considerable deficiency in the supply of oxygen to the combustion chambers, so that temperatures were seriously reduced.

It therefore became the practice to restore all retorts showing persistent ignition in the air ducts to normal steaming until they could be repaired at the next scurfing period. This repair work became so extensive that in order to keep retorts in action on carrier gas, the personnel employed on repair work had to be doubled. At the temperatures prevailing in the affected zone, welding could not be practised, and it was necessary to improvize special bent barrels for the cement gun to be used in the corners of the retort in an endeavour to force cement into the joints. This technique achieved some success, but it proved of a temporary nature and would require frequent repetition at scurfing periods at a considerable labour cost.

(2) *Coal Gas Injection*

Following the experience with blue water gas it was evident that higher carrier gas rates were necessary, and the month of August was spent in experimenting with a few retorts at high coal and carrier gas rates. Particular attention was paid to the quality of the coke, and late in August the 2 in. to 0 in. coals became available. There was at once a marked improvement in the steadiness of coal travel and stability of the process generally. Coke discharged had a better appearance with a generally larger size, and there was no evidence of fine coal in the breeze. Also the intermittent discharge of raw coal practically ceased, indicating that very little channelling of the coal charge was now occurring.

By September 10, however, the incidence of gas leakage at the base of the retorts was becoming more serious, and of 34 retorts only 23 could be operated on carrier gas. It was at this point that the cement gun work was intensified.

By September 20 conditions had been set for a test run with coal gas injection, but only 24 retorts could be used with carrier gas; intermittent leakage necessitated putting an average of 2.5 retorts on normal steaming, while 7.5 were left out for scurfing and repair. Details of running are given in the paper.

The maximum throughput attained was 14.0 tons per retort per day, but at this throughput coal travel was erratic, partly due to severe caking across the top of the charge which frequently showed a dull red at the rodding holes. The coke quality also indicated that the coal throughput could not be further raised, and any reduction in carrier rate to relieve top conditions had an adverse effect on the volatile matter in the coke.

Under the accelerated conditions of this test, retort bottom pressures increased, and more retorts began to show leakage, indicating also the temporary nature of the repairs effected earlier. Attention is drawn to the calculated calorific value of the neat gas produced in the coal gas tests, which is at least 40 B.Th.U. per cu.ft. lower than the normal value. This is a measure of the degradation and loss of thermal yield occurring with coal gas recycling.

(3) *Mixed Gas Injection*

The coal throughputs of 12.84 and 12.17 tons per retort per day for the two weeks of this test were reasonably good at the higher carrier gas injection rates employed. A mixed gas calorific value of 492.4 B.Th.U. per cu.ft. was maintained by varying the composition of the mixed carrier gas and, while this averaged approximately equal quantities of coal gas and water gas by volume, the proportion of water gas that could be used varied from 70% to 40%, and on several days this required to be adjusted frequently. The tendency with both mixed gas and coal gas injection was to give a greater swing of calorific value, as the calorific value of the injected gas falls with any drop in calorific value of the total gas produced and vice versa. The steadiness of coal travel was affected considerably during this test by a somewhat greater variation in the proportion of coals having a swelling index from 5 to 7½.

(4) *Carrier Gas Operation at Normal Throughput and Reduced Temperatures*

The time remaining in which to investigate these conditions was very limited, and it is not claimed therefore that the operating conditions represent the most efficient technique. The work, however, showed several interesting features worthy, perhaps, of further study.

It was clear from earlier work that some coal gas at least would be required in the carrier, and test conditions could be set therefore with the following alternatives in mind: (a) To maintain the maximum possible gas injection rate to effect the maximum heat transfer to the upper part of the charge, and thus to obtain a minimum fuel consumption. (b) To reduce the carrier rate to a minimum consistent with good coke quality, in an endeavour to minimize thermal loss by degradation, at the expense of a higher fuel consumption.

As the primary purpose of this test was to attempt to determine the lowest permissible combustion chamber temperature consistent with a normal throughput, the first of these two alternatives was selected.

The severe degradation which occurred made it necessary to use 100% coal gas as carrier; any attempt to introduce blue water gas and to obtain a compensating gain in calorific value by reduction in degradation produced violent variations in quality and a final calorific value below permissible limits.

During the week previous to the tests, setting temperatures were steadily lowered. There is reason to believe, however, that these could have been further reduced, resulting in an even lower fuel consumption.

Operating conditions for this test became comparable with normal steaming, and there was no difficulty in maintaining a good coke. It was also found possible to maintain a good coke with a carrier rate of 7,000 cu.ft. per ton of coal, but at lower rates coke became dirty with the evolution of brown fumes.

The foregoing endeavours to give a picture of the practical implications relating to the process, and a more theoretical analysis of the results is given in a subsequent section. It is perhaps appropriate, however, to note at this stage the following general features:—

(a) *Coke Quality.*—It appears fundamental to the process that the production of coke with a low volatile therm content is a function of the carrier gas/coal throughput ratio. Also, for a given ratio, the limiting coal throughput is that at which reasonable conditions at the top of the charge can be maintained. Coke quality becomes therefore a major feature of control of the process.

(b) *Retort Bottom Pressures.*—Gas leakage through the bottom section of the retort was not due to violent increase in pressure at the base of the retort with carrier gas injection. While normal steaming will give pressures varying between +0.2 and −0.2 in. w.g., the pressures during the blue water gas tests were +0.24 in. to level gauge. With large-sized coals, however, bottom pressures fluctuated severely at gas

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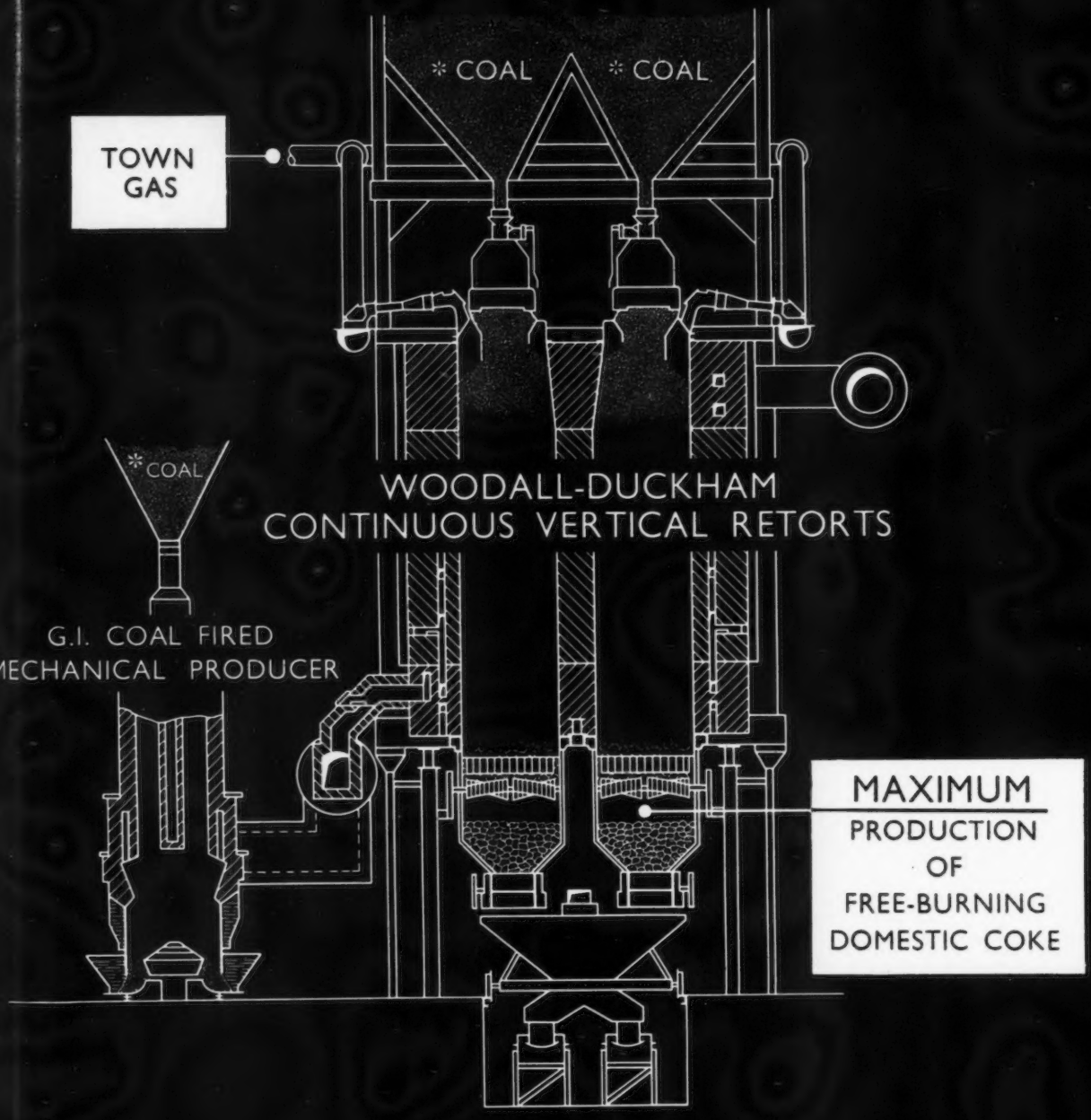

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8× 8	58	1400	96	3000
12× 8	77	2100	127	4500
16× 8	96	2800	153	6000
20× 8	115	3500	182	7500
24× 8	134	4200	211	9000
28× 8	153	4900	240	10500
12×12	103	3150	157	6750
16×12	124	4200	190	9000
20×12	147	5250	224	11250
24×12	172	6300	257	13500
28×12	195	7350	290	15750
32×12	219	8400	324	18000
16×16	152	5600	228	12000
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24×16	210	8400	304	18000
28×16	237	9800	342	21000

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injection rates in excess of 6,000 cu.ft. per hour between +0.2 in. and +1.5 in. w.g., averaging +0.5 in. on retorts travelling reasonably well. With the steadier travel obtained by the carbonization of smaller coals at a throughput of 13 tons per retort per day, injecting 4,500 cu.ft. of gas per hour, the bottom pressure ranged between +0.5 in. and −0.1 in., with an average of 0.2 in. w.g., increasing to 0.4 in. at a throughput of 14 tons per day with the injection of 5,500 cu.ft. of gas per hour. During the test with normal throughputs at reduced temperatures the retort bottom pressure averaged −0.15 in. w.g.

(c) *Scurf Formation.*—No accurate comparison of the rate of scurf formation in relation to normal practice was possible with the short test periods adopted. There was evidence, however, of some increase particularly in the upper zone of the silica section.

The Results Obtained

In Table I the principal results are summarized, for comparison with the results obtained in normal operation from the Bow Common installation, while Table II shows the operating costs calculated from the results.

Coal Throughput

The throughput obtained with a given coal is a function of the rate of gas injection. The normal throughput at Bow Common is 8.9 tons per retort per day, or 9.3 tons under conditions of maximum output. By injecting 4,870 cu.ft. of blue gas per ton of coal carbonized (2,391 cu.ft. per retort, per hour) the throughput was raised to 11.78 tons, and by the injection of 9,212 cu.ft. of coal gas per ton (5,373 cu.ft. per hour) a throughput of 14.0 tons was attained. This represents an increase of 57% above normal.

The throughput obtained presumably does not depend materially on the nature of the carrier gas injected, so that a throughput of 14.0 tons per retort per day could have been achieved at Bow Common by the injection of sufficient blue-gas. This, however, would require the production of mixed gas at a calorific value of 450 B.Th.U. per cu.ft., which would require external enrichment in order to maintain the declared calorific value of 500 B.Th.U. per cu.ft.

Coke Production

Probably the only effect of gas injection on the gross yield of coke and breeze is an increase in yield of about 0.22 cwt. per ton of coal carbonized, as a result of the cessation of water gas production in the retorts by steaming. The variations in gross yields of coke and breeze recorded in the tables are due primarily to unavoidable errors in determination over short periods.

The yield of coke and breeze for sale is, however, affected by the fuel consumption and the requirements of the water gas plant.

During the trials with blue gas injection the residual volatile therm content of the total coke and breeze produced was exceptionally high, at 18.9 therms per ton. In later trials a more completely carbonized product was obtained the volatile therm content being 10 therms per ton of coke in the first trials with coal gas, 11.2 therms in the second trial with coal gas, 9.7 therms in the mixed gas trials, and 6.8 therms per ton in the experiment at reduced temperatures. Abnormally high volatile therm contents of the coke are not necessarily an essential feature of the process, and it is probable that normal volatile therm contents of 5 to 7 therms per ton of coke can be attained. It should be noted that these results are obtained by the Board's standard test method, described by Bispham and Weston, and not by the method described in B.S.S. No. 1016, which gives rather lower results. The ex-

CARRIER GAS EXPERIMENTS, BOW COMMON

TABLE I.—SUMMARY OF RESULTS

	1	2	3	4	5	6
Gas injected and coal size	Steam 5½% 6 in.–0 in.	Blue Gas 6 in.–0 in.	Coal Gas 2 in.–0 in.	Mixed Gas 2 in.–0 in.	Coal Gas 2 in.–0 in.	Coal Gas 2 in.–0 in.
						(Reduced temps.)
Average number of retorts:—						
Gasmaking (carrier gas)	—	29.0	25.1	27.5	25.4	27.0
,, (steaming)	31.5	1.2	2.2	1.4	2.6	2.1
Scurfing or under repair	2.5	3.8	6.7	5.1	6.0	4.9
Combustion chamber temperatures (°C):						
Pass 1	1305	1316	1312	1315	1321	1243
Pass 3	1336	1332	1340	1341	1340	1241
Pass 6	1093	1085	1087	1103	1089	980
Coal carbonized:						
Tons per carrier gas retort per day (estimated)	8.9	11.78	11.71	12.64	14.00	8.91
Proximate analysis: moisture, %	5.5	6.2	6.6	5.5	5.7	6.2
ash, %	4.6	5.7	6.1	6.1	5.8	4.0
Swelling number	4½	6	5	6	6	6
Total gas injected:—						
Volume per retort per hour, cu ft.	—	2391	4163	4528	5373	4051
Volume per ton of coal carbonized (carrier gas retorts only), cu. ft.	—	4870	8528	8594	9212	9096
Water gas injected:—						
Calorific value, B.Th.U./cu. ft.	—	283.3	—	309.2	—	—
Volume per ton of coal carbonized (all retorts), cu. ft.	—	4722	—	4097	—	—
Therms per ton of coal carbonized	—	13.38	—	12.67	—	—
Coal gas made:—						
Volume per ton of coal carbonized, cu. ft.	14,349	10,866	11,520	11,125	11,007	12,439
Calorific value, B.Th.U./cu. ft.	512.2	583.4	519.9	559.9	537.8	508.9
Therms per ton of coal carbonized	73.51	63.39	59.89	62.29	59.19	63.30
Therms per ton of coal (8% moisture and ash)	75.22	66.20	68.11	64.79	61.53	64.84
H.E.V. Therms per ton coal as charged	33.06	32.85	27.51	30.96	28.29	29.32
H.E.V. Therms per ton coal (8½% moisture and ash)	34.20	34.19	28.99	32.20	29.41	30.04
Equivalent thermal yield of gas at 500 B.Th.U. per cu. ft. and 9% inerts in gas with coal at 8% moisture and ash, therms per ton	81.2	81.4	68.8	76.5	69.8	71.3
Therms per carrier gas retort per day (estimated)	650	743	691	782	812	558
Total gas produced:—						
Calorific value, B.Th.U. per cu. ft.	512.2	492.5	519.9	492.4	537.8	508.9
Total volume per day. Thous. cu. ft.	3917	5499	3603	5479	4112	3224
Total therms per day	20,066	27,085	18,731	26,979	20,560	16,406
Therms per ton coal carbonized	73.51	76.77	59.89	74.96	59.19	63.30
Dry coke and breeze, cwts. per ton of coal carbonized:—						
Used in producers	1.90	1.64	1.84	1.65	1.62	1.47
To water-gas plant	—	1.61	—	1.26	—	—
Balance made for sale:—Coke	9.32	7.59	8.54	8.44	8.87	10.02
Breeze	2.07	2.51	2.49	2.25	2.66	2.07
Total yield	13.29	13.35	12.87	13.60	13.15	13.56
Volatile therm content of coke and breeze, ex retorts, therms per ton	6.0	18.9	10.0	9.7	11.2	6.8
Tar produced: gal. per ton coal carbonized	13.9	14.3	16.3	17·8	15.8	15.8
Ammonia, gal. 10 oz. liquor per ton coal carbonized	29.6	28.5	28.5	31.0	27.5	27.7
Total waste heat steam generated, lb. from and at 212° F. per ton of coal	1100	958	972	860	877	662

TABLE II
CARRIER GAS EXPERIMENTS AT BOW COMMON
Cost per therm of producing gas ex Retort House

Column number (reference to Table I)	1		2		4		5		6	
Conditions	Normal Steam Admission		B.W.G. Injection		Mixed Gas Injection		Coal Gas Injection		Coal Gas Injection (reduced temperature) (b)	
		d.		d.		d.		d.		d.
Coal		16.216		15.527		15.903		20.138		18.831
Less Residuals:—	d.		d.		d.		d.		d.	
Coke	6.829		6.348		6.917		7.973		8.705	
Breeze	.830		.968		.865		1,281		.979	
Tar	1.238		1.228		1.561		1,757		1.656	
Liquor	.109	9.006	.104	8.648	.120	9.463	.135	11.146	.126	11.466
Net coal		7.210		6.879		6.440		8.992		7.365
Production wages (Retort house only)		.654		.701		.704		.859		.747
R. and M. retort house, excluding resetting		.349		.327		.334		.422		.404
Retort house resetting		.558		.534		.548		.693		.648
Injected B.W.G. or C.W.G.		—		1.665		1.606		—		—
Credit for surplus steam		—		*Cr.* .069		*Cr.* .082		*Cr.* .164		*Dr.* .244
Total		8.771		10.037		9.550		10.802		9.408
Adjustment for coal, coke and breeze (*a*)		±0.000		−.375		− .184		− .591		+ .041
		8.771		9.662		9,366		10.211		9.449
	Cost of Gas diluted to 500 B.Th.U./ cu. ft. (except for Cols. 2 and 4)									
	%	d.					%	d.	%	d.
Gas ex retort house	96.94	8.771					91.48	10.211	97.73	9.449
B.W.G. diluent	3.06	9.552	(C.V. 4925)		(C.V. 492.4)		8.52	9.552	2.27	9.552
		8.795		9.662		9.366		10.155		9.451

NOTES.—(*a*) Adjustment to give cost per therm from coal at the same ash+moisture content and giving same gross yield of wet coke and breeze per ton as in Col. 1.
(*b*) Although the average number of retorts working with gas injection was 27.0, with 2.1 working with normal steam input, the costs have been adjusted to 30.5 retorts working with carrier gas injection, 3.5 retorts scurfing.

ceptionally high results obtained in the experiment with blue gas injection are, however, significant in relation to the gas-making results.

Yield of Coal Gas

Direct comparisons of the yields of coal gas from the various experiments are complicated by differences in calorific value, and for this reason it is best to consider the results obtained in terms of the Hydrocarbon Enrichment Value (H.E.V.) The normal H.E.V. obtained at Bow Common is 34.2 therms per ton of coal containing 8% moisture plus ash, and the average value of 34.19 therms per ton obtained in the blue-gas experiments is therefore normal. If credit be taken for the exceptionally high volatile therm content of the coke produced, there may be a small gain in H.E.V. by the injection of blue gas.

The injection of coal gas, however, results in a very considerable reduction in H.E.V. to 29.4 therms per ton, and this is equivalent to a loss of 11 therms of gas at a calorific value of 500 B.Th.U. per cu.ft. per ton of coal carbonized.

As might be expected, the injection of a mixture of blue gas and coal gas resulted in a thermal yield intermediate between the yields obtained with blue gas and coal gas, the H.E.V. on the 8% ash plus moisture basis being 32.2, equivalent to a loss of 5 therms of gas at 500 B.Th.U. per cu.ft. per ton of coal.

The high yields of tar associated with the higher throughputs may be partly responsible for these losses; the undercracking normally encountered with the gas produced in the upper part of a continuous vertical retort is presumably accentuated by the shorter time contact. However, undercracking results in the production of gas at high calorific values, whereas the calorific value of the gas produced when injecting coal gas or mixed gas was unduly low. This indicates degradation of the hydrocarbon content of the gas injected at the base of the retorts. The volumes of the various constituents of the purified gas made per ton of coal carbonized have been calculated and, when adjusted for the ash and moisture in the coal, are as shown in Table III.

The most important feature of the above results is the deficiency of unsaturated hydrocarbons and ethane in the gas produced when injecting either coal gas or mixed gas, as compared with the results obtained with blue-gas injection. Since the yield of gas made in the retorts is calculated by subtracting the volume of gas injected from the total output, it may be assumed that the deficiencies are the result of degradation of the injected gas. The low yields of hydrogen are to some extent related to the high residual volatile therm content of the coke produced. (The results are further discussed in the paper.)

TABLE III.
Volumes of Constituents.
Cu. ft. per ton of coal containing 8% ash plus moisture

Constituent	Normal Steaming	B.W.G.	Coal Gas	Mixed Gas
CO_2	396	250	206	244
CnHm	323	328	275	267
O_2	118	91	91	69
CO	1,674	874	1,042	1,053
H_2	7,827	5,710	5,778	5,925
CH_4	2,790	2,735	2,769	2,756
C_2H_6	382	374	240	297
N_2	1,175	986	1,042	1,023

Tar Yields.

The tar yields recorded in the trials with coal gas injection and mixed gas injection were remarkably high, and in view of the difficulty in measuring tar yields over short periods under works conditions their reliability is somewhat doubtful. If the recorded yields are in fact too high the cost of gas production will be higher than shown in Table II.

Fuel Consumption.

All fuel charged to the producers was weighed and sampled under direct supervision of the research staff. At the normal throughput the fuel consumption at Bow Common is 9.5% (dry basis) and at the maximum throughput of 14.00 tons per day, obtained with coal gas injection, the fuel consumption was 8.11%. The lowest fuel consumption recorded was 7.34%, with normal throughput at reduced temperatures.

Four of the retorts were specially equipped with a circulating system for the water supplied to the sprays in the coke boxes, and over a period of four days when the retorts were working normally with steam admission, the quantity of water supplied as make-up to the circulating system was measured. All coke discharged was weighed and its sensible heat content determined while the heat removed by the cooling water was also measured. The experiment was repeated over a further period of four days while the retorts were operating at a throughput of 13.3 tons per day while injecting 4,500 cu.ft. of coal gas per hour. The results obtained were as shown in Table IV.

These losses, together with the sensible and latent heat of the crude gases leaving the retort and the heat of carbonization of the coal, are the sole heat requirements of the process, for with a minimum rate of steam admission the endothermicity of the water-gas reaction can be supplied from the

sensible heat of the coke. Thus it would appear that, when injecting 8,000 cu.ft. of coal gas per ton of coal, the heat losses at the base of the retort are reduced by about 0.7 therms per ton.

The carrier gas injected, however, carries heat away from the top of the retorts in the crude products. This partly offsets the saving at the base of the retort; the difference

TABLE IV

TABLE IV.—HEAT LOSSES FROM COKE BOX. THERMS PER TON COAL CARBONIZED

	Normal Working	Coal Gas Injection
Heat in coke discharged	0.6	0.6
Heat lost to cooling water (including latent heat of evaporation)	2.1	1.7
Radiation and convection loss from coke boxes, etc.	1.3	1.0
Total losses	4.0	3.3

cannot be regarded as significant in relation to the accuracy of the measurements. The sole economy in fuel appears to be that associated with the smaller radiation and convection loss per ton of coal at the higher throughput. In the experiment at reduced temperatures the radiation and convection loss and the waste gas loss were simultaneously reduced, so that an even lower fuel consumption was recorded. The sensible heat content of the coke leaving the carbonizing zone at a mean temperature of 1,000°C. is 10.0 therms per ton. The general conclusion is that by comparison with the normal heat recovery from coke at Bow Common, the additional heat recovery by injecting a carrier gas is small.

In view of this, the observations made on the temperatures in the retort walls at Kensal Green are of special interest. The difference in temperature between the flue face and the carbonizing face of the wall of the retorts is normally 145°C. at a point 3 ft. from the top of the retort, 180°C. at a depth of 8 ft., and 145°C. at a depth of 16 ft. When injecting a carrier gas at 4,000 to 4,500 cu.ft. per hour, these differences became 130°C., 200°C. and 195°C. It is clear that over a very high proportion of the heated height of the retort, the introduction of a carrier gas increases the rate of heat transmission through the retort walls, presumably by increasing the rate at which heat is transferred from the wall into the charge, and this is one of the primary reasons for the increased throughput obtained by injecting a carrier gas. The heat input at the top of the retort appears to be reduced, because additional heat is transmitted to the top of the charge by the increased volume of hot gas ascending from the lower levels.

No adjustment has been made to the fuel consumptions recorded for retorts working normally or retorts at scurfing temperatures, and variations in the number of retorts under repair are believed to account for the differences in fuel consumption between the test with blue gas injection and the other tests at Bow Common. Also during the trial with blue gas injection the organization for dealing with leakage from the retorts was not fully developed, and some heat may have been supplied for carbonization by the combustion of blue gas leaking from the base of the retorts.

Waste Heat Steam Production.

The waste heat steam production for the various tests is at a substantially constant rate of production per ton of fuel burned in the producers.

There is normally a surplus of some 7,200 lb. of steam per hour from a retort bench at Bow Common; this surplus was increased when injecting carrier gas because no steam was used in the retorts (except during purging) and, except when the temperatures were reduced in the last test, the boiler output was increased. The surplus increased to a maximum of 9,700 lb. per hour during the test with coal gas injection at the maximum throughput, but decreased to 4,200 lb. per hour in the test at low temperatures. A credit is therefore shown in Table II for the value of surplus steam additional to that normally obtained.

Leakage of Gas from Retorts.

Analyses of average samples of the waste gas at the inlet of the waste heat boiler were carried out during the trials, and the total loss of coal gas into the flues was calculated from the CO_2 content of the waste gas. The maximum loss of gas so detected was 2½ therms per ton, which is not significantly different from that obtained in normal practice. It must be noted that leakage of blue-gas cannot be detected by this method and, during the test with blue-gas injection, leakage was not so well controlled as in later tests. In view of the visible leakage into the secondary air ducts of certain retorts, a further investigation was carried out by analyses of samples of air drawn from the secondary air flues. It was concluded that although leakage from the base of the retorts into the air flues presented a serious operating difficulty and a continuous maintenance problem, it would appear that the gasmaking results were not unduly affected thereby.

Total Thermal Output.

Since the use of coal gas or mixed gas as carrier is unlikely to have any practical application for efficient gas manufacture in view of the serious thermal loss by degredation, operation on blue water gas may be taken as a basis of comparison of thermal output from Bow Common in relation to conventional methods of gas production. For this purpose the results obtained with blue-gas injection have been used to calculate gas production on the basis of a throughput of 13 tons per retort per day, with carrier gas at the rate of some 8,000 cu.ft. per ton. This is regarded as a throughput which could be operated on the existing plant with reasonable reliability and working conditions for personnel.

(1) Output under normal conditions:—

Coal gas	7.85 mill. cu. ft. per day at	512 B.Th.U. per cu. ft.	40,200 therms
C.W.G.	2.25 ,, ,, ,, ,, ,, ,,	458 B.Th.U. per cu. ft.	10,300 ,,
Total	10.10 ,, ,, ,, ,, ,, ,,	500 B.Th.U. per cu. ft.	50,500 ,,

It may be noted that for peak periods the retort house could produce 8.4 mill. cu.ft. per day at 512 B.Th.U. per cu.ft. or 43,000 therms diluted to a calorific value of 500 with 2.25 mill. cu.ft. of C.W.G. at 458 B.Th.U. per cu.ft. giving a total output of 53,300 therms per day.

(2) Carrier gas operation.

The blue water gas available would provide sufficient carrier gas for 19 retorts leaving 42 retorts to be operated on normal steaming after deducting the usual scurfing allowance. These conditions would produce:—

Neat coal gas from carrier retorts— 2.66 mill. cu. ft. at 584 B.Th.U. per cu. ft. ..	15,500 therms
Normal coal gas from remaining retorts— 5.42 mill. cu. ft. at 512 B.Th.U. per cu. ft. ..	27,800 therms
B.W.G. used as carrier— 1.97 mill. cu. ft. at 285 B.Th.U. per cu. ft.	5,600 therms
Total = 10.05 mill. cu. ft. at 487 B.Th.U. per cu. ft. ..	48,900 therms

This represents a reduction in total thermal output of 3.2% on normal steaming operation or of 8.2% for peak load normal steaming. Moreover, to correct the calorific value to 500 B.Th.U. per cu.ft. some form of enrichment would be required or a reduction in the rate of carrier gas injected combined with the production of normal coal gas at a calorific value above 512.

It may be shown that, with these carrier gas conditions applied to both benches by the installation of adequate blue water gas plant, the final calorific value of the gas produced would be some 457 B.Th.U. per cu.ft. or, if one bench on carrier gas were operated with one bench on normal steaming, the final calorific value would be some 476 B.Th.U. per cu.ft. By adopting coal gas injection on both benches the output could be increased to about 55,000 therms per day, an increase of 9% at the cost of a lower thermal yield per ton of coal.

(*to be continued*)

The golf competition at the spring meeting of the Wales and Monmouthshire Section of the Institution of Gas Engineers at Tenby was well supported. The Upjohn Cup was won by Mr. W. K. Parsons, who tied with Mr. Darrell W. Rees with 73 net but had the better figures coming home. A non-member, Mr. G. Speakman, returned the lowest score with 71 but was not eligible for the cup. He received a prize of three golf balls. The Dean Cup was won by Mr. G. Kelly and Mr. A. Dyer on the last nine holes after tying with Mr. J. P. Smith and Mr. Gordon Davies 78 each. A special prize of three golf balls was won by Mr. E. J. Perks for the highest gross score of 121.

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The *new* National Benzole Mixture adds the known great benefits of Benzole to a new high-grade petrol drawn from the most modern refineries in Great Britain. Modern refinery techniques are primarily designed to raise the aromatic content of the motor spirit produced. Aromatics are the key substances in motor spirits—responsible for high anti-knock rating, smooth burning and maximum mileage per gallon.

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NB29/30

Welded pipe in position ready for lowering into the trench.

The North Wales Gas Pipeline

THE North Wales gas grid, when completed, will consist of a high pressure pipeline from Llangollen through Wrexham to Connah's Quay and along the North Wales coast as far as Caernarvon, with a branch over the Menai Straits to Anglesey. From this grid will be supplied gas to some 25 gas undertakings, as indicated on the map which we reproduce on page 380.

The gas collected and distributed by this grid will come from three sources:—

(1) *The Maelor gasworks of the Wales Gas Board.*

This is a new gasworks recently completed by the Wales Gas Board at Maelor, 3½ miles east of Wrexham.

(2) *Coke oven gas from John Summers and Sons, Ltd., Shotton.*

This coke oven gas is produced as a by-product of the production of blast furnace coke.

(3) *Methane from Point-of-Ayr Colliery, National Coal Board.*

Methane drained from the coal seams of this colliery will be reformed so as to be interchangeable with coal gas.

The collection and distribution of this gas by means of the grid will lead to greater efficiency, save 76,000 tons of coal per annum, and provide adequate supplies of gas for present and future domestic, commercial and industrial requirements. The grid system will comprise of about 130 miles of high pressure pipe lines.

Hedges and other obstructions to the right of way are cleared by large bulldozers before the work commences.

The North Wales gas grid is of particular interest and importance for the following two reasons.

(1) It will be the first gas grid system in the British Isles to take as one of its sources of supply methane drained from a coal mine and reformed to be interchangeable with coal gas.

(2) It will be the first gas grid system constructed in the British Isles using the modern pipelining methods so successfully developed and used in America. These have now been specially modified to meet the conditions of ground and countryside in North Wales.

The total number of consumers in the undertakings which will be connected to the grid system is about 70,000 and supplies of gas will be possible to all those villages, at present not supplied with gas, which are situated near the route of the pipeline. Full provision has been made in the design of the grid system for future development in demand for gas. It is anticipated that an increase in demand will arise very quickly after the completion of the grid construction. It is indicative of such development that in Wrexham area, where the new gasmaking plant at Maelor was put into use in the autumn of 1953, a considerable increase in demand has already taken place. For the year ended March, 1955, the gas output was 10% in excess of that for the previous year.

The development of the British gas industry has been such that the transmission of gas has, until recently, been on a comparatively local basis. Some transmission systems have been constructed, but the mains have to a large extent been laid through built-up or partially built-up areas and there has been little, if any, opportunity of using the pipelaying methods so successfully developed in America to take advantage of cross-country rather than urban routes.

Most roads and footpaths in built-up areas contain other services such as local gas and water mains, electricity and telephone cables, drainage pipes, etc. The presence of these other services tends to slow down the rate of mainlaying. Such work also results in disturbance of road surfaces and dislocation of traffic. Fortunately, it is possible to route grid mains, which transport bulk supplies of gas only, away from the larger built-up areas and to choose cross-country routes.

The tremendous amount of long-line cross-country pipelines constructed in the United States during the last 16 or 20 years for fluid transmission has led to highly organized and mechanized methods of construction. The unit of construction is a 'spread.' A 'spread' consists of a number of

separate operations, each performed by a specialized section of the 'spread.' Each operation is so organized that almost equal and continuous movement of the job is maintained. For the construction of the North Wales pipeline a construction 'spread' has been organized. Special plant has been imported from the United States. American pipeline specialists are training machine operators and generally establishing the methods.

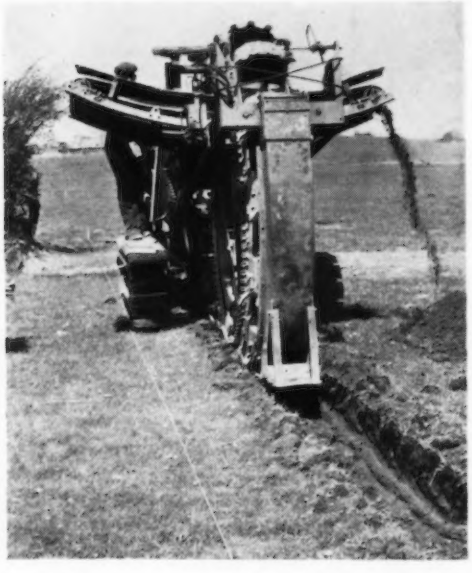
The units of operation in the North Wales 'spread' are as follows:—

(1) *Clearing right-of-way.*

A 40 ft. wide working strip is used for the pipeline construction. The right-of-way crew clears the working strip in advance of all operations. Hedges, banks and stone walls are removed and replaced with temporary post and wire fences. Sleeper bridges are constructed across ditches. Transverse slopes are cross graded to provide a level working space. The function of this operation is to clear any obstructions which would delay the movement of machines along the working strip.

(2) *Stringing pipe.*

The stringing crew transports the 30 to 40 ft. long pipes from the dumps using pole waggons drawn by tractors and lays them out along the right-of-way ready for the bending, line-up and welding crews.



On the left is the small Cleveland trencher removing the first few inches of top soil.

On the right is the larger Cleveland trenching machine which digs the trench varying in depth from 4 ft 6 in. to 6 ft. according to requirements.

(3) *Bending.*

A side-boom tractor equipped with a bending 'shoe' is used to bend any pipes necessary to fit contours in the ground and trench.

(4) *Line-up and weld.*

This crew lines up and welds the pipes into a continuous line. Where necessary, the bends made by the bending crew ahead are inserted. The pipes are electrically butt-welded. The welding crew for the 12¾ in. pipeline at present being constructed consists of six welders, working in three groups of two welders. An internal line-up clamp is used for holding the pipes in position while two welders apply the 'stringer bead.' The line-up clamp is then pulled along the pipe to the next joint and 'stringer bead' welders move with it. They are followed by two more welders who apply the first 'hot-pass' welding run over the 'stringer bead,' and they, in turn, are followed by two more welders who apply the second 'hot pass' run and the 'capping' run. Each joint, therefore, has four welding runs. A percentage of the welds are radiographed, using a gamma-ray source. Convenient sections of 1,000/4,000 ft. are capped and filled with air at a pressure of 100 lb. per sq. in. The welded joints are then tested with soap and water. Separate small welding gangs follow behind to make the 'tie-in' welds between sections after the pipeline has been lowered into the trench. 'Downhand' welding is being used. The welders have been specially trained by an American specialist.

(5) *Testing.* (After the pipe has been lowered and backfilled.)

Although the pipeline will initially operate at pressures of about 40/50 lb. per sq. in., it is designed for considerably higher operating pressures in the future. The pipeline is, therefore, subjected to a strength test of 250 lb. per sq. in. This is carried out in four to six mile sections using compressed air. In built-up areas the strength test is at 300 lb. per sq. in. and is hydraulic. These tests are followed by stringent long period leakage tests at 100 lb. per sq. in.

(6) *Pipe coating.*

This is applied in two operations. Each operation is carried out by machines specially imported from the United States and used here for the first time in Great Britain.

(a) *Clean and prime.*

This machine travels along a welded-up section of the pipeline. The front end of the machine consists of revolving knives and brushes which clean the outside of the pipeline, removing old primer, rust and any dirt collected during previous operations. The rear end of the machine consists of a sling which applies and spreads evenly a thin coat of primer.

(b) *Coating and wrapping.*

When the priming coat is dry, a second machine travels along the pipeline. This machine applies a coating of coal tar enamel about $\frac{3}{32}$ in. thick and simultaneously pulls into the enamel fibre-glass tissue as a reinforcement. This final coating is tested with a brush-type electrical 'holiday' detector. This detector finds any imperfections or even pinholes in the coating. These are made good before the pipe is lowered into the trench.

(7) *Excavation.*

The trench, which is 3 ft. 6 in. to 4 ft. in depth, is cut in two stages. A small American 'Cleveland' wheel type excavator travels along the line of the trench and removes the top 9 in. of soil. This is placed on one side of the trench. This excavator is followed by a larger machine of similar type which cuts the remainder of the trench, placing the subsoil on the opposite side to the top soil. In rocky ground the trench is cut by a 'back-hoe.' In hard rock, the trench is blasted with explosives ahead of the pipe stringing.

(8) *Lowering-in.*

The welded and coated pipeline is now lowered into the trench by side-boom tractors over the heap of top soil. In long sections, the completed pipeline is flexible and the side-boom tractors can travel along the side of the pipeline and lower it into the trench in stages.

(9) *Backfill.*

The sub-soil is now filled back into the trench using bull-dozers and special grab-buckets. The filled-in soil is consolidated by running one track of a tracked machine, such as a bull-dozer, over the track. Finally the top-soil is spread back over the filled-in trench. Land drains, where cut during

excavations, are replaced and supported before the back-filling is started.

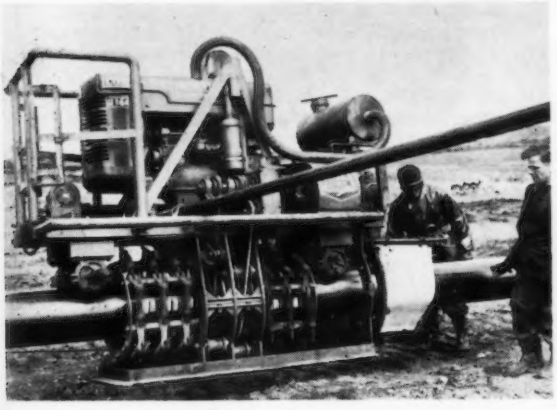
(10) *Clean-up.*

This consists of re-making banks and hedges, re-building stone walls, tidying up the right-of-way, and any cultivation necessary along the right-of-way.

(11) *Cathodic protection.*

To ensure a long life for the pipeline and to prevent leakages arising from corrosion pitting, the coal tar enamel protective coating will be supplemented by a system of cathodic protection. This will be generally of the impressed current type in which the pipeline is maintained electrically as a cathode to an anode in the form of graphite ground beds. Any corrosion will then take place on the ground beds instead of on the main. Soil resistivity tests are taken along the line during construction as a guide to soil conditions. Corrosion test points are welded to the main at about ¼ mile intervals. The final scheme, of cathodic protection cannot be designed and installed for some months after construction since electrical currents resulting from welding can remain in the pipeline for considerable periods. These affect the current drainage tests on which the protective scheme is based.

It is the essence of 'pipelining' as developed in the United States that each of the operations described is carried out by a separate self-contained unit of the whole 'spread.' It is the object of each of these units to keep ahead of the unit next behind and to try and catch up the unit ahead. By the use of these methods and with full pre-planning one pipeline



A close-up view of the pipe cleaning and priming machine.

'spread' in the United States would, under normal conditions, complete one to two miles of pipeline per day.

This is productivity applied to constructing a pipeline. It is achieved in the United States by a high degree of mechanization and a carefully developed mental attitude to the 'job' by all working on the spread—engineers, foreman, skilled and unskilled labour.

The aim in this North Wales experiment was to lay at a minimum rate of half mile per day. Although work only got under way at the end of March, each of the units has already shown that this figure can be exceeded. There would seem to be no reason why at least one mile of pipeline per day should not be achieved.

Contractors, Suppliers, and Inspectors

Main Contractors.—Costain-John Brown, Ltd., London.

Weld Inspection.—Welding Supervision, Ltd., London.

Materials (Pipe).—12¾ in. O.D. by ¼ in. seamless steel tube. Grade B. to Specification A.P.I. 5L. Phosphate treated and descaled—coated externally with 70B. primer and internally with red lead. Supplied by Stewarts and Lloyds, Ltd.

(*Coating.*) 70 B. primer. 70 B. coal tar enamel. Supplied by Wailes Dove Bitumastic, Ltd. Hebburn, Co. Durham.

(*Fibreglass.*) 'Fibreglass' tissue type 'H.' Supplied by Fibreglass, Ltd., St. Helens, Lancs.

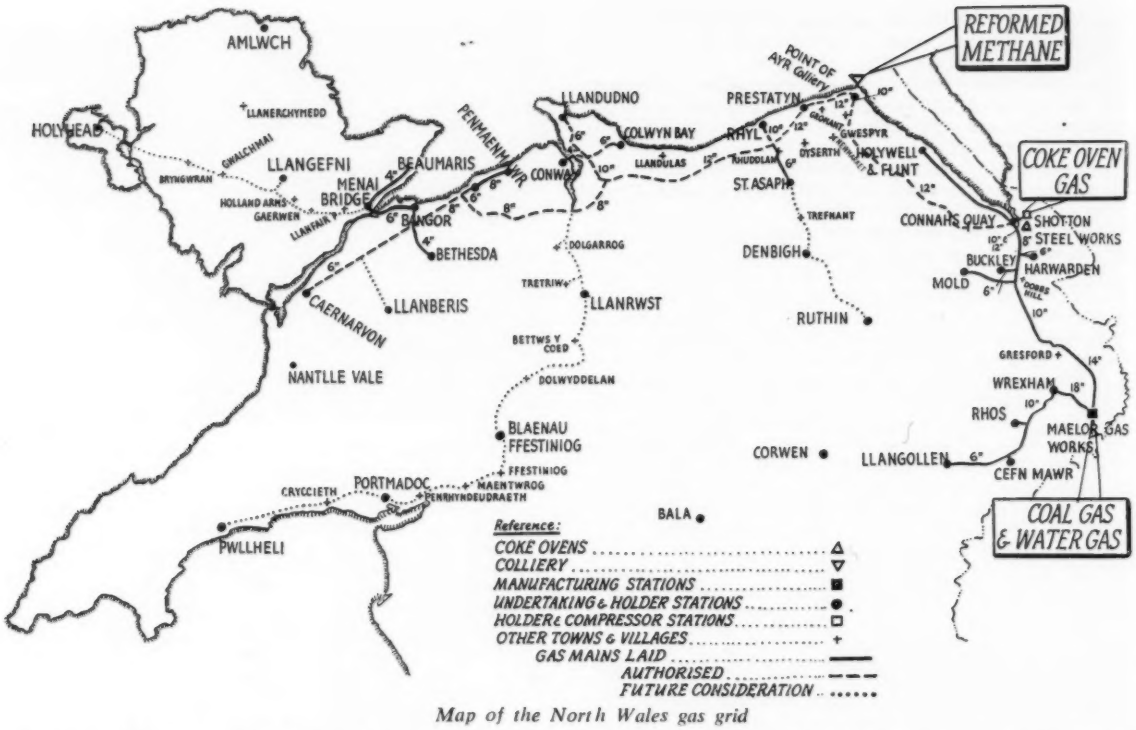
Welding the pipe, which reaches the site in 30 ft. and 40 ft. lengths.

There was an official visit to the North Wales project last Friday, when Mr. T. Mervyn Jones, Chairman of the Wales Gas Board, accompanied by Sir Harold Smith, Chairman of the Gas Council, Sir Stanley Rawson, Chairman of Costain John Brown, Ltd., Mr. W. T. Hird, Distribution Engineer, Mr. O. P. Cronshaw, North Wales Grid Manager, and a number of members and officers of the Board, met representatives of the Technical and lay Press at a remote spot on the side of the Halkyn mountain off the Chester-Hawarden-Northop-Holywell-St. Asaph road. They visited six sections of the pipeline, some miles apart, and saw all the processes involved in the scheme with the exception of the pipe wrapping, which had to be suspended because of the bad weather.

Mr. Mervyn Jones, at the close of the tour, summed up what had been seen, and gave credit to Mr. W. T. Hird, Distribution Engineer, who was a member of an O.E.E.C. mission to the United States to study long distance transmission problems, for satisfying the Board that this method was suitable for application in North Wales. The next problem was to find someone to do the work, and the Board approached a number of contractors in Great Britain; Costain John Brown were the one firm who were prepared to 'have a go' at what was an entirely new venture so far as Great Britain was concerned.

It transpired in the course of questions and answers that the total cost of the North Wales Grid was expected to be about £2 mill., of which about half represented the cost of the pipeline. Its total length, as at present planned, would be 131 miles. Endorsing Mr. Mervyn Jones' remarks, Sir Harold Smith emphasized that this was a Wales Gas Board enter-

When the work is completed very little trace of disturbance of the landscape is visible. Only the distribution engineer and his staff need to remember where the pipe has been laid.



Map of the North Wales gas grid

prise which did not require the official approval of, but certainly had the blessing of the Gas Council. Such a development would have been impossible without nationalisation because the numerous small undertakings could never have tackled anything on so large a scale. Integration was proceeding throughout the industry, and some 200 works had ceased to make gas, but no other board had undertaken a scheme that could be compared with that in North Wales.

Sir Stanley Rawson spoke of the contractors' attitude towards the grid and said there was no similar scheme that his Company would not be prepared to tackle. They had had nothing but first class co-operation from their American friends, to whom they had had to turn for the equipment used on the project. The success of such an undertaking depended on two things—good men and good equipment—and they had had both. Mechanization would have been useless if they had not had the people to operate it.

Dealing with some further questions, Mr. Mervyn Jones said that gas-making would cease at a number of works, but in view of the problem of finding alternative work for employees—a problem which had been dealt with satisfactorily in other parts of Wales—he preferred not to go into detail. Many small communities hitherto out of reach of gas supplies would be able to have gas, but there were technical and financial difficulties in the way of providing gas for everybody en route. If there was a commercial demand, however, it would be met by tapping the grid. It was hoped that gas would be passing through the pipeline by September, increasing in quantity by next year. There was a co-ordinating committee considering the possibilities of taking surplus gas across area board boundaries. 'The Gas Board boundary,' said Mr. Mervyn Jones, 'will never be allowed to become the engineer's iron curtain.' With Welsh pride he added that the pipes used in the scheme were made by Stewarts & Lloyds, Ltd., at their Newport, Mon., works. The contractors were using the best known methods of testing and wrapping.

Midland Juniors Annual Meeting

The annual report and statement of accounts for the jubilee session, 1954-55, were presented by Mr. H. J. Reynolds, President, on behalf of the Council of the Midland Junior Gas Association to its members on April 26. The membership of the Association is now 463, the same as at this time last year.

The report said that papers presented during the year had been of a high standard, the authors being: Mr. H. Kettlewell, Mr. G. E. Brooke, Mr. H. Mellors, Mr. W. Walling, Mr. F. Grocott, and Mr. G. E. Palmer (who presented his paper immediately after the annual meeting). During the session visits had been made to the works of the Audley Engineering Co., Ltd.; Walker, Crosweller Co., Ltd.; John Thompson, Ltd.; Jeavons Engineering Co.; Stafford Gasworks; Electric Construction Co., Ltd.; Sidney Flavel and Co., Ltd. (Ladies Day 1954). All these visits had proved interesting and instructive. The Council placed on record the thanks of the Association to the directors and managements of the firms visited for the warm welcome and for the hospitality they had extended to the members. The Council congratulated Mr. W. Bevan-Lewis, who was awarded the M.A.G.E.M. Prize for Session 1953-54 and Mr. A. E. Mason, who was awarded the S.B.G.I. Silver Medal for 1954.

Mr. D. J. O. Bath, Oxford was invited by the Council to become Junior Vice-President and, in accepting, Mr. Bath said that he was honoured and hoped that he would be worthy.

A vote of thanks to the retiring Council Members, Mr. A. V. Wainwright and Mr. A. W. Fowmes, was proposed by Mr. S. C. Crathorn and seconded by Mr. J. A. W. Stretton. In a ballot which followed Mr. S. C. Porter (Birmingham), and Mr. N. Calvert were elected as Council Members in their place. Mr. H. J. Reynolds proposed a vote of thanks to the officers and this was seconded by Mr. Crathorn.

Mr. J. A. Tomes proposed that Mr. H. J. Reynolds should take over the position of Hon. Secretary for the next session and this was seconded by Mr. J. Palser and unanimously accepted. Mr. Devey had taken on the job for the 1954-55 Session, since Mr. Reynolds was President, and both Mr. Tomes and Mr. Reynolds said how grateful they had been to him for doing so.

In the unavoidable absence of Mr. G. H. Potter, Mr. Crathorn read his educational report. A ballot then took place for the election of three representatives, Mr. F. L. Atkin, Mr. A. W. Sanders and Mr. J. A. Tomes being successful.

Mr. G. E. Palmer presented a paper on 'Works Locomotive Tyres.'

Selling Industrial Gas*

By W. F. S. Howell, M.Inst.GasE., M.Inst.F. †

INDUSTRIAL gas is *all* the gas sold for use on industrial premises. The definition of what constitutes industrial premises is laid down by the Ministry of Fuel and Power for the purpose of their Form G.Ret.I. Annual Return, *viz.*:—

'Industrial premises should include factories, workshops and other industrial premises (including those of nationalised industries) where goods, commodities or articles are produced, manufactured, processed, and/or repaired for profit. Farms and horticultural premises and mines and quarries should be included, and also Royal Naval dockyards, Royal Ordnance factories and railway workshops.'

Usually the handling of all enquiries from industrial premises is carried out by a Group's industrial sales staff.

One of the most consistently encouraging results in the North Western Gas Board's annual reports has been the steady increase in the sales of gas to industrial consumers. During the period 1950 to 1955 the Board's industrial gas sales have increased by approximately 23 mill. therms per annum, or 29.5%, and is now approximately 104 mill. therms, or 29% of the Board's output. With the exception of the East Midlands and West Midlands Gas Boards, the North Western Board has the highest industrial sales in the country. The other boards are, however, also showing increase in industrial sales; the total increase throughout the country from 1951 to 1954 was 11.8%.

Increasing industrial load is, of course, no new thing; most gas undertakings records will show a steady increase in industrial consumption since about 1934. This date coincided with many larger undertakings setting up industrial sections and the formation at national level of the Industrial Gas Centres Committee; there can be little doubt that these factors have played a not inconsiderable part in the subsequent development of the industrial load. True, there have been other reasons including an enlightened price policy by many undertakings and a gradual acceptance by manufacturers that a refined fuel such as gas was, in the long run, the most economical for many of their processes. At the present time there is an undoubted trade boom (apart from the cotton industry) and the consumption of all fuels is showing an increase throughout the country. Furthermore, South Lancashire and Merseyside are scheduled as Development Areas and many new factories are being erected there. From figures available, however, it is evident that the rate of expansion of industrial sales is higher in the North Western Gas Board's area than that of most others.

Increased loads are resulting both from the installation of new equipment and the conversion of existing equipment from other fuels to town gas, while the concurrent loss of loads from town gas to alternative fuels has been small. In the writer's opinion three important reasons for this recent rapid increase of industrial gas in this Board's area have been:—

(1) The increased availability of gas and the provision of adequate mains to carry it, in areas previously without such services.
(2) The extension of the services of trained industrial engineers to areas previously without these facilities.
(3) The Board's industrial gas tariff policy.

Approach to Industrial Selling

The selling of gas for industrial purposes differs profoundly from that for domestic purposes. The fundamental difference being that industrial engineers aim to sell gas rather than appliances, and the essential requisite to achieve this object is the provision of a technical fuel consultant service. There are literally thousands of different industrial processes utilizing gas and even for the same process the requirements differ from factory to factory. Not only should the industrial engineer have a comprehensive knowledge of fuel technology and the general principles underlying the design of gas-fired plant, but he should have some basic knowledge of the industries in which he is called to advise. The main work of selling industrial gas is done on the factory floor and the industrial engineer or representative must be foremost a technician, and secondly a salesman. He in turn must be backed by an organisation which can feed him with information and find the answers to problems that the district representative cannot solve.

In order to sell our product the industrialist has to be first convinced that gas is the best fuel for his purpose. Before the industrial engineer attempts to do this, however, he himself must be confident in his own mind that gas is the best proposition. If he considers this is not the case, then he should say so; after all it is our duty to give to consumers the best possible advice, for the axiom of success is the creation of confidence between us. If we secure the order for a gas-fired plant and the user is not satisfied with it, he will soon cease to use gas and his confidence will be lost resulting also in the loss of further business for which gas could legitimately be claimed as the best fuel. Factory managers are usually shrewd business men with a thorough knowledge of their own requirements and while they are willing and even eager to discuss any technically sound proposition which will result in improvements in their own production methods, they have no desire to waste their time with representatives whose technical ability they have reason to doubt.

The selling of industrial gas is carried out both by the Board's industrial staff and by the manufacturers of industrial gas appliances, the two parties working either separately or together. Their respective motives are, of course, somewhat different. The industrial engineer wishes the user to purchase a well-designed gas appliance that will ensure the consumer being thoroughly satisfied both with the appliance and more particularly with town gas. On the other hand the appliance manufacturer wishes to sell his own product and is not so directly concerned with the fuel to be used. Fortunately, the majority of recognized industrial appliance makers can be relied upon to produce and sell a well-designed piece of equipment. There are, however, some other makers whose equipment falls below present-day standards of design and the users of which are likely to succumb to the claims of alternative fuels. The closest collaboration between the Boards' staffs and equipment manufacturers should be encouraged to ensure the continued increased sales of industrial gas appliances.

Alternative Fuels

For certain industrial processes the choice of suitable fuels is limited, *e.g.*, only coke is suitable for a foundry cupola, only electricity is suitable for certain types of steel melting and other high temperature furnaces, and only gas is suitable for the blowing of glassware and the singeing of yarn. The majority of heating operations, however, can be carried out by any fuel and consequently for most processes all fuels are in competition with each other. The available fuels and their present approximate basic costs per therm are as follows:—

Coal	3d.-3.5d.
Coke	4.5d.
Anthracite	6.5d.
Oil	5.3d.-12d.
Producer gas	5d.-12d.
Town gas	10d.-19.25d.
Electricity	19d.-73d.

By one of those fortuitous dispensations of nature (either human or otherwise), the overall efficiency of application of the various forms of fuel is roughly in inverse ratio to their prime cost—*i.e.*, the cruder the form of fuel the cheaper it is to buy. While town gas is the most refined fuel, it will be seen that with the exception of electricity, it has the highest basic cost per therm. One of the most important functions of an industrial engineer is to convince the industrialist that the

* From a paper presented to the North Western Gas Board Area Conference at Morecambe, April 21 to 23.

† Group Industrial Engineer, Manchester Group.

true cost of a fuel is not its basic cost per therm, but is the overall cost of fuel used per unit of production perfectly treated. In order to put the true case for town gas the engineer must be able to assess all those advantages which will be of particular significance to the process under review. Discerning factory management will be appreciative of any advantages which will be of direct benefit to them, and they will be prepared to credit such advantages with a monetary value to offset against the higher basic fuel cost.

Advantages of Town Gas Relative to Most Other Fuels

The advantages of town gas may be summed up as follows:—

Minimum Overheads. No space required for storage of fuel or ashes, no tall chimney required, no labour for stoking or ash removal, no heating or pumping of fuel required, reduced maintenance, reduced insurance.

High Efficiency of Application. Gas-fired appliances are easily controlled either manually or automatically; the minimum of excess air is required thus resulting in relatively low flue losses; usually no separate combustion chamber is needed; full use can be made of hot face insulation bricks consequently greatly improving overall efficiency. In many cases direct firing can be employed, whereas with other fuels indirect systems are essential. Owing to the flexibility of town gas it lends itself very well to modern production techniques.

High Quality of Product. Improved product quality can frequently be achieved due to the constant quality of the fuel, ease of automatic control of both temperature and atmosphere, and in some instances to the cleanliness and low sulphur content.

High Output of Product. Increased output often results due to high rate of heat release possible, together with the ease of maintaining constant conditions.

Hygienic and Aesthetic Considerations. A clean fuel is an obvious essential in a food factory, but even in places such as foundries and engineering works, cleanliness is important from its effect on the appliance operatives both from the health and psychological points of view.

A most important additional consideration which is recently receiving increasing emphasis is that of smoke abatement. It may be said that town gas is the only fuel completely smokeless under all normal conditions; furthermore, the amount of sulphur dioxide produced by it is almost infinitesimal when compared with that from other fuels. In stating his case for gas the industrial engineer must select from the above factors those which he considers will be of significant importance in the process under discussion. Generally the industrialist, even if he is prepared to admit all the claims put forward, will require the Board's representative to prove conclusively that if gas is chosen the overall cost of production will be less than with other fuels.

Development Work

The gas industry, if it wishes to prosper and expand, or for that matter even to survive, must be prepared to spend money on development and research. This applies with at least as much force to industrial utilization as it does to any other branch of our activities. Many of the boards and their predecessors have already made valuable contributions in developing new industrial appliances, but this type of work should be done on a much greater scale than hitherto. Reputable firms of appliance makers also contribute to this development work, but it is doubtful whether their efforts surpass those of the gas undertakings. When any new piece of equipment has been developed by a gas board and there is likely to be a market for it, the normal practice is to pass the designs out to an appliance manufacturer for general production.

A few well-known pieces of equipment which were first developed by gas undertakings include: Radiant heat tunnels, radiant heat panels, concentrated combustion burners, hypact burners, Sheffield controlled atmosphere furnaces, Vyse and Segas pottery kilns, Negas cremators, etc. These items are mostly fundamentally new designs of equipment which have a wide or fairly wide general application and can be ultimately expected to be produced in quantity. In addition to such standard equipment there is also a considerable demand for development work on equipment for which only one or two orders may be expected. Many enquiries are received for such plant and the gas boards offer a unique service to prospective consumers in developing and designing such equipment.

Advice on Fuel Economy

One of the industrial engineers' most important duties is advising consumers on fuel economy with particular emphasis on ensuring that no gas is wasted. This is a service that the gas industry has been providing for many years—long before the fuel shortage and official Ministry fuel saving campaigns. Furthermore, it is a service which is available to our consumers without additional charge. To ensure that any new plant supplied conforms to the highest practical standards of thermal efficiency is, of course, a *sine qua non,* but we must also see that all existing gas fired plants are operating at maximum efficiency. There are many instances where existing loads have been in danger of being lost, but the industrial engineer by improving appliance efficiency has been able to bring the balance in our favour. Such improvements vary from advice on setting of controls to completely re-designing the plant.

The Tools for Selling Industrial Gas

From previous paragraphs it will be appreciated that in order to give a satisfactory service to our industrial consumers we must have an adequate organization. The industrial engineer must not only have a sound technical training, but he must have access to the following:—

(1) A comprehensive file of information on all types of industrial gas installations and including makers' catalogues and a library of appropriate books.
(2) A classified consumer record index system containing all the essential information both for dealing with subsequent enquiries and for market research.
(3) A drawing office with draughtsman trained in the design of industrial appliances.
(4) A laboratory where equipment can be effectively tested.
(5) A development workshop where prototype appliances can be made.
(6) A showroom where a range of industrial equipment is available for demonstration purposes.

All group industrial engineers should have at least the first two of the above in his own group, and access to the latter four at an industrial centre.

The proposed reconstruction of the Manchester industrial centre was described by the Manchester Group General Manager, Mr. John Wilson, in his recent paper on 'Opportunity.' Work is now already at an advanced stage on this building. Accommodation will include demonstration showrooms, development and research workshops, drawing office, laboratory, library, lecture theatre, training centre and administrative offices. Plans are also in hand for the reconstruction of the Liverpool centre. When these centres are completed we should provide a service second to none in the country.

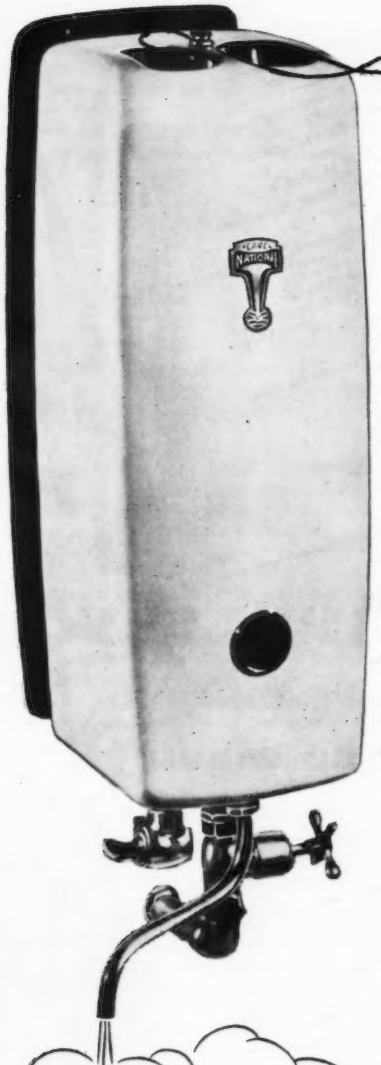
Information Records

It will be obvious that because of the numerous subjects with which an industrial engineer has to deal comprehensive records of information both on processes and on individual consumers are desirable. A classification scheme on processes is already in general use throughout the area, and it is hoped that a standard industrial consumer record system will shortly be inaugurated. A comprehensive classification scheme with appropriate headings for easy reference of all main subjects and processes concerned with the use of gas in industry has been developed by the Industrial Gas Development Committee and adopted nationally throughout the gas industry. This classification scheme has no less than 360 headings and provides an ideal system for filing (and subsequently finding) information on any aspect of gas utilization.

Some of the most useful information contained in the files are the quarterly reports of appliances and installations issued by the Industrial Gas Development Committee. It must be emphasized, however, that for everyone to receive the most benefit from the reports there has to be a two-way traffic. The industrial staff of each area board is expected to send regular reports on recent novel or interesting installations to the Gas Information Bureau for re-distribution to the whole country. If each group engineer in the Board's Area can supply material for one report per annum we will be making more than our fair contribution to the nation's pool. These I.G.D.C.

(Continued on p. 386)

FROM Flavels of Leamington TO The Nation!



THE

FLAVEL National

INSTANTANEOUS GAS WATER HEATER

This broken feed type heater is designed for wall fixing. Suitable for use with either hard or soft water the Flavel National provides half a gallon of hot water per minute as required. The vitreous enamel casing is easily removed thereby enabling the consumer to clean the heat exchange unit by washing it under a tap.

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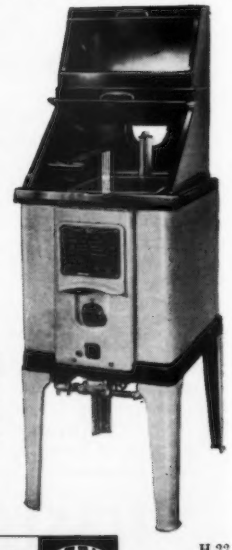
MAIN GAS COOKING APPLIANCES

are used in restaurants throughout the country

The extensive range of Main large-scale cooking appliances covers the specific requirements of every type of catering establishment. Highly efficient in use and economical on gas consumption, Main appliances are strongly constructed to withstand continuous heavy usage .... When it's a question of kitchen equipment, consult R. & A. Main, Ltd.

DYW 2/62 Range
Two ovens, each with automatic heat control. Hotplate has 10 boiling burners or can be made up of a combination of boiling and grill burners.



GF 91/R Fat Fryer
This deep fat fryer is fitted with automatic fat or oil temperature control. Cold zone and crumb well to pan. Available with or without chip box over pan.

GG 225 Griller
An inexpensive griller fitted with two burners and having a grilling area of 15″ x 8½″. Available as table model with or without 4″ counter stand; or fitted on a 36″ high stand.

R. & A. MAIN Ltd. Gothic Works, Edmonton, N.18 : Gothic Works, Falkirk

Note the name - made by MAIN

H.22

*Education the Most Potent Weapon for Survival**

By J. WOODCOCK Assoc.M.Inst.Gas E.†

THE gas industry is experiencing difficult times (indeed with the ever increasing costs and availability of the essential raw materials it is likely to experience even more problems) and in consequence the necessity for the well trained technical personnel becomes more pressing. The necessity for the most careful and efficient use of the limited amount of coal available is now accepted by all, but the position has not improved since the Ridley Committee comprehensively investigated the matter in 1952. The following table extracted from page 217 of the report, particularly when associated with the present trend in coal production, has a sinister significance.

	1951 Annual Consumption mill. tons	1961-5 Estimated Demand mill. tons
GAS	27.4	38
Electricity	35.5	63
Railways	14.3	15
Coke Ovens	23.5	26
Industry	45.5	56
Miners and Collieries	15.6	12
Domestic	32.4	40
Overseas shipments and bunkers	11.7	30
Miscellaneous	13.6	13
Totals	219.5	293

It is obvious that the expectation of 300 mill. tons of coal in 1965 is wishful thinking. The Coal Utilization Council has made much play on the variety of appliances using coal with increased efficiency which are available, and this suggests that domestic requirements of coal might well be reduced. The demands of the British Electricity Authority for its allocation of coal to be doubled seems difficult to justify and even then could hardly be met. The more modest demand of the gas industry—only 30% extra—must be dismissed as a theoretical approach to a very practical and pressing problem. The gas industry must and will survive, but to earn that survival must direct its resources, as indeed it has in the past done with some measure of success, towards producing the gas required by the consumer from the same, or an even smaller, tonnage of coal than it has previously demanded.

Best Hope of Saving Coal

The Wales Gas Board has made and is now making great progress towards this end. The best hope of saving coal (again according to the Ridley Committee) lies in the replacement of obsolete plant by new plant and in concentrating gas making in the larger and more efficient works by building oven gas grids. The Board is making full use of sources of coke oven gas, refinery gas, L.P. gas and methane situated within the area. The result of this policy will, it is reported, be an annual economy of almost 1¼ mill. tons in the Board's coal requirements by 1957. Economies of this nature are, however, dependent on the existence of untapped sources of supply, without which all the alertness and progressiveness of the Board would be of no avail.

The materials available for gas production may well be limited, but I have no doubt that the members of this and countless other technical associations will find ways and means of utilizing existing resources to even better advantage. We must, however, look to our educational system as the most potent weapon of our survival, but before giving this consideration it is necessary to ensure that suitable material is available and ready to take full advantage of the facilities available for training. From various reports, such as those of the Examiners of the Institution of Gas Engineers, there is comment as to the inadequacy both of the candidates who offer themselves for examination in gas technology and of the various institutions in which they are trained. Steps are being taken by the Institution of Gas Engineers and the area boards to improve the facilities available for training, but the problem of recruitment remains.

Students Creamed Off

It must be remembered that ever increasing numbers of the best students have been creamed off to the universities and it remains for the gas industry, along, it must be added, with a large number of other industries, to get the second and third bests. It is, therefore, essential for close contact to be maintained between local managements and the science masters of grammar schools so that no potential gas engineer of promise is lost. The gas industry does offer attractive careers in a variety of professions and occupations, the facilities now available for training are excellent compared with those in existence twenty years ago; the criterion is not that there are attractive careers or excellent facilities, but how attractive or how excellent these items are in comparison with those offered by other industries.

The attractiveness or otherwise of a career can be roughly assessed as directly proportional to the financial return, but this particular aspect must be considered outside the scope of this address. The facilities for the educational development of apprentices, pupils, and indeed all members of the Board's staff are worthy of consideration.

The year 1954 saw the implementation of the 1948 revision of the Education Regulations of the Institution of Gas Engineers which provided for the cessation of the Ordinary and Higher Grade Examinations in Gas Engineering (Manufacture) and (Supply) and all the candidates were required to take the new Associate Membership Examinations. Aspirants to the title of 'Chartered Gas Engineer' had previously been able to satisfy the academic requirements of Corporate Membership of the Institution after a period of four years' study, presuming them to hold a Matriculation or General School Certificate at the time of entry into the industry. The current regulations materially extend the minimum period of study and present particular difficulty to students in areas remote from approved instruction centres.

Three Examples

In this respect it is perhaps of interest to note the progress in three cases involving pupils accepted in 1949 by the Wales Gas Board.

Pupil 1.—The pupil had previously obtained a School Certificate with a distinction in Physics and six credits including Chemistry and Mathematics. Successes to date: (1) Ordinary National Certificate (Mechanical Engineering); (2) Higher National Certificate (Mechanical Engineering); (3) 1st and 2nd years A.R.I.C. Chemistry Course.

Pupil 2.—The pupil had previously obtained a School Certificate. Successes to date: (1) Ordinary National Certificate (Mechanical Engineering); (2) Higher National Certificate (Mechanical Engineering); (3) Ordinary National Certificate in Chemistry; (4) Industrial Administration (Endorsement on H.N.C.).

Pupil 3.—The pupil had previously obtained a School Certificate. Successes to date: (1) Ordinary National Certificate (Mechanical Engineering); (2) 1st and 2nd years A.R.I.C. Chemistry Course; (3) 1st year of Higher National Certificate (Mechanical Engineering).

All these pupils have benefited by release to attend day classes on one or two days per week as the necessity arose. Each attendance at college involved travel of about 100 miles so that where possible the student stayed overnight in a college hostel if it was possible to arrange the studies on adjacent days. This was unfortunately not always possible. The students' difficulties are obvious and the progress made

* From a Presidential Address to the Wales and Monmouthshire Junior Gas Association at its annual meeting at Porthcawl on April 14, 1955.

† Wales Gas Board, Colwyn Bay. Owing to Mr. Woodcock's absence through illness, the address was read by his successor, Mr. C. E. Banham (Cardiff).

in all three cases must be commended. However, after five years' study the more fortunate of these students may be able to satisfy the requirements of the Associate Membership Examination in the next three years.

The difficulties are real and once appreciated must act as some deterrent to prospective entrants to the industry, and it is imperative that the position is relieved. The education programme is one aspect of the gas industry on which the views of 'juniors' must be respected. The junior has contact at first hand with the problems confronting students in their thirst for knowledge—while some sections would have us believe (perhaps not without some foundation) that the spirit of enterprise in the younger generation is not what it used to be in 'their days,' I would suggest that it may not be the lack of enthusiasm but perhaps a lack of the right sort of encouragement from those who are occupying senior positions.

The present day student now attends perhaps two full days each week at a technical college with the remaining three or four days spent in the industry. It seems worthwhile considering the possibility of granting time off for study in relation to the enterprise and initiative of the individual concerned. The three cases outlined show that each student has followed an almost exactly similar course; each has had the same number of days' leave to attend classes. The progress made has been markedly similar, the difference being chiefly explained by the varying exemptions granted as a result of the standards achieved at the grammar schools. Three months, or even six months intensive courses are obviously still necessary to reduce the number of years engaged in study: the student could well be restricted to one day each week at technical college and an assessment of their performance in this medium could qualify them for a place at an intensive course which could be especially arranged to meet the peculiarities of the Associate Membership Examination. A scheme of this type could well meet the principal objections to the present Education Regulations —the time involved in meeting their requirements.

SELLING INDUSTRIAL GAS—from p. 382.

reports are of two types—'confidential' and 'non-confidential.' While both types are of considerable service to the industrial engineer the 'non-confidential' reports provide us in addition with most valuable publicity material.

Publicity

As previously stated the main work of selling industrial gas is done by the industrial engineer on the factory floor, but this work must be supplemented in many ways if we are to capture all the load for which we can legitimately claim that gas is the most suitable fuel.

The other main avenues through which we can convey to our prospective consumers information on how gas can assist them in their production problems are as follows:—

(1) Advertising.
(2) Contribution of articles to the technical press.
(3) Distribution of technical literature.
(4) Exhibitions.
(5) Showrooms.
(6) Talks and lectures to technical societies.
(7) Films for use in Board sponsored shows or for loaning out to appropriate organisations.

All the above are powerful selling aids if full advantage is made of their respective potentialities.

For industrial publicity media advertisements are of particular importance, as often they offer the only opportunity of reaching personnel with whom the industrial engineer is not normally in contact. Such people may include management and directors at one end of the scale down to the newcomers and the younger generation who may become the executives of the future. The Gas Council already carry out a considerable amount of advertising of industrial gas in both the technical and the national Press, while the North Western Gas Board concentrates largely on the local Press. Publicity experts and technical men rarely see eye-to-eye in deciding the most suitable form of advertisement to achieve optimum results. To design a layout which among pages and pages of other publicity material will catch the potential consumer's eye is a formidable task. It is, therefore, with some temerity that the writer offers the general views of industrial engineers on this aspect of selling.

The most powerful form of industrial gas advertisement is considered to be the selective specimen type in which a particular interesting and impressive installation is featured by a technically descriptive photograph and an informative paragraph giving details of the installation. It is appreciated that the task of collecting this material must fall back on the industrial engineer and, moreover, it is not always easy to obtain an industrialist's permission to publicize an installation in his factory.

Conclusions

During question time at two or three of the Board's earlier Annual Conferences there was an impression of a sense of frustration among a number of the industrial personnel. They felt that the industrial section was likely to become the Cinderella of all the Board's activities. Today, however, the position has become much clearer and brighter. We are in a better position to appreciate the Board's long-term planning and to realize that Rome was not built in a day and that first things had to come first. The production and distribution sides were obviously of prime importance. We now have adequate supplies of gas in all areas, and at all times—even in the middle of the recent cold spells. Nobody is better able to appreciate the value of this boon than the industrial engineer who has on successive years suffered periods of low pressure and had to go round—cap in hand—to his industrial consumers and ask them to reduce consumption. The author is sure that he has the support of all his colleagues on the industrial side and more particularly that of all industrial consumers in thanking the North Western Gas Board for having had the foresight to install the necessary gasmaking plant.

CHEMICAL ENGINEERS' NEW HEADQUARTERS

The Council of the Institution of Chemical Engineers has accepted a generous offer of accommodation by the Society of Chemical Industry which has acquired new headquarters in Belgrave Square, S.W.1. The Institution will shortly occupy the ground, first, and second floors of No. 16, Belgrave Square, as a temporary home. Sir Harold Hartley, referring to this development in his Presidential Address to the annual meeting of the Institution on April 26, said the Institution had long outgrown its present premises. The generosity of a few kind friends, whom he would name in alphabetical order and thank collectively, would enable them to furnish and equip their new rooms to the best advantage. They would have a comfortable library and the pleasure of being in their new rooms would, he hoped, make them a frequent meeting place for members. The names of kind friends which they must record appropriately in Belgrave Square were the British Petroleum Co., Courtaulds, the Distillers Co., Esso, I.C.I., the Shell Petroleum Co., and Unilever. In the new quarters, provision would be possible for small informal meetings of members to discuss current problems in which they were specially interested. Referring to the members of the Institution who had died during 1954, the President mentioned, in particular, Mr. V. F. Gloag, Mr. Hugh Griffiths, Mr. E. F. MacTaggart and Dr. Rau. The meeting paid a tribute of silence to the deceased members. The number of full members of the Institution, said the President, was 534, an increase of 37 since January 1, 1954, of whom 36 had come in this year. The total number of Members and Associate Members had increased by more than 100 in the last 16 months. The election of the following Honorary Officers and Council was announced:—President: Mr. John A. Oriel, C.B.E. Vice-Presidents: Dr. W. Idris Jones, Dr. N. E. Rambush, Dr. H. L. Roy, Mr. P. K. Stancring. Joint Hon. Secretaries: Prof. M. B. Donald, Mr. F. I. Warner. Hon. Treasurer: Mr. F. A. Greene. Ordinary Members of Council (elected by ballot): H. D. Anderson, W. E. Aylwin, K. Fraser, R. C. Odams, J. P. V. Woollan. Assoc. Member of Council: C. G. Bacon.

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The *Warming Chamber*—a feature of the NEW WORLD Range—gives her what she's always wanted. An independently heated unit, it can warm sixteen large dinner plates and keep food hot for as long as required without burning.

". . . I don't get upset about the family coming in late for meals now. You see, I can keep things hot without spoiling for as long as I like . . ."

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GAS AT THE B.I.F.

Some Industrial Exhibits Reviewed

The British Industries Fair is again with us, at Castle Bromwich and Olympia, but not this year at Earl's Court. Both sections of the Fair, which is being run this year for the first time wholly as a commercial undertaking, opened on May 2 and will remain open until May 13. As in former years, the gas industry and its friends are strongly represented among the thousand or so stands in the Birmingham Section, and the following notes may serve to give an indication of the field covered.

Needless to say, the industry's principal representative is the Gas Council which has an impressive stand showing a variety of new equipment. Its main theme is 'Heat for Industry,' and by illustrating the use of gas in three main branches of industry, it draws attention to the service which gas can give to all who need to use fuel and heat treatments in factory or workshop. The three main sections of the stand are devoted respectively to the plant maintenance and repair shop, direct fire air heating for processes, and the pottery and ceramic industries.

Repair Shop Equipment

Gas equipment has a large part to play in the day-to-day problems of the plant maintenance and repair shop, which must not be confused with the heat treatment shop, which is part of the production line in the factory, and quite a separate subject. The maintenance and repair shop must be fully equipped with all the necessary tools. Of the gas-fired appliances shown in this section, the principal exhibit is a working demonstration of oxy-coal gas cutting (Hancock and Co., Ltd., Croydon). Very accurate control of dimensions can be achieved in cutting substantial thicknesses of material. The bending of pipes is another vital part of the work of the maintenance shop. When a bend is to be made it is essential that the flow through the pipe should not be impeded, and friction resistance should be kept to a minimum. The new bender demonstrated on the stand by the East Midlands Gas Board has been specially designed for this work. There are, too, many processes in the shop for which it is essential to have a continuous supply of soft molten metal. The design of the melter exhibited ensures that the material can be heated with a minimum of oxidation or formation of dross. The brazing hearth (A. H. Wilkes and Co., Stourport) enables small components to be handled with ease.

A small size general purpose furnace, manufactured by Fuel Furnaces, Ltd., of Birmingham, is typical of many of the furnaces which are used throughout the country. It is capable of temperatures of up to 1,100°C. and can be used for a variety of small heat treatment operations. Two soldering irons are shown—one typical of those used for local heating; the other, manufactured by the Aeromatic Co., Uxbridge, has the advantage of being continuously heated. Different jobs can, therefore, be carried on with the iron without sending it back for re-heating. It can be supplied in a variety of shapes and sizes, enabling the work to be carried out at various angles. The Radiation Group Sales glue pot heater is designed to keep quantities of glue in a molten state, as there is a constant demand for this in maintenance shops.

Direct-fired Processes

The second section of the stand demonstrates the use of direct-fired air heating processes. This is a subject of growing importance in view of the fact that the thermal efficiency of such a process can reach 90%, a much higher figure than that achieved by indirect heating. Hot air is generated rapidly and within a very short time—minutes or even seconds—and the process is thermostatically controlled. Examples displayed on the stand of materials which can be dried in this way included cocoa and coffee beans, tobacco, wood chips, cereals, nuts, and silver sand. In addition to the use of hot air for drying processes, air at a high temperature generated by similar means may be used for annealing and tempering of light alloys, glass, and other objects. The advantages are demonstrated by a number of units which are fully instrumented and equipped with flame failure devices and automatic ignition. One, provided by the North Thames Gas Board, shows the principles of operation and control. A larger scale heater, supplied by Dunford & Elliott (Sheffield), illustrates a typical full-scale unit. The size of this unit can be increased if necessary.

A similar unit is designed by the Harris Engineering Company and one, shown by the North Eastern Gas Board, is designed for special purposes in the aircraft industry. A model of the Keith Blackman heater illustrates the burner equipment used. This unit, using a suction burner, works with the aid of induced draught. The exhibits on this section of the stand also include one of a range of compressors manufactured by Alfred Bullows & Sons, Ltd. (Walsall).

Pottery Making

The stand shows two cross-sectional models of the pottery-making process. The centre piece of this section of the stand is a showcase displaying some of the high quality finished china ware which has been fired in gas-heated kilns.

The Gas Council Coke Department also has a stand showing boilers, etc.

TRADE STANDS

The Aerograph Co., Ltd., specializes in air compressors and portable and stationary spray guns, and exhibits on its stand an excellent display of these and of such equipment as air regulating valves, pressure feed tanks, etc.

Aiton & Co., Ltd., show examples of high and low pressure pipework in carbon and alloy steels, with a variety of expansion fittings and examples of welded joints.

John Allen & Sons (Oxford), Ltd., limit their exhibits to equipment of an agricultural or horticultural nature.

Autocontrol Boilers, Ltd., show a new 'Vulcan' No. 1 gas-fired boiler with an output of about 26,500 B.Th.U. per hour. Completely automatic, the boiler is fitted with a thermocouple flame failure device, and all gas controls are concealed inside the boiler casing. The output can be increased by fitment of further sections.

Geo. Bray & Co., Ltd. (Gas Burner Division) exhibit gas jets and burners for domestic and industrial heating and lighting apparatus operating not only on town gas but also on natural and bottled gases.

The Bristol Piping Co., Ltd., displays a variety of flanged piping and pressure vessels in carbon steel and low alloy steel; also headers, benders, jacketed pipes, etc.

The British Thermostat Co., Ltd., shows a selection from its range of automatic controls for gas, solid fuel, and other appliances. Seamless metallic bellows and packless seals and glands are also exhibited.

Gas Controls

The British Vacuum Cleaner and Engineering Co., Ltd., makers of 'Goblin' domestic cleaners, also show their industrial portable appliances and fixed central installations.

Cinema-Television, Ltd., displays various types of electronic metal detectors, automatic ejection devices, and electronic instruments, including frequency measuring equipment, voltage regulators, multi-channel recorders, etc.

Robert Cort & Son, Ltd., exhibit screening conveyors for coke, coal, and other materials, as well as a portable coke debreezing unit. Gas valves constitute a further exhibit.

Dennison & Son, Ltd., show a 'Blake-Dennison' automatic totalizing belt conveyor weigher, and a variety of weighing and testing machines.

Dunford & Elliott (Sheffield), Ltd., exhibit an air heater which has been in use for years as part of the firm's rotary louvre dryer and cooler, and is now being marketed as a separate piece of equipment. Advantages include simplicity, coolness round inner face, and high thermal efficiency.

The Dunlop Rubber Co., Ltd., has as its main theme hoses for the oil industry, but hoses for many other purposes are shown, as well as the latest range of 'Fortiflex' containers, anti-corrosion and abrasion resisting linings, cover rollers, and all types of conveyors, transmission and vee belting.

The Electric Construction Co., Ltd., shows industrial electrical equipment comprising rotating machines, switch and control gear, static transformers and rectifiers, with special emphasis on heavy current rectifiers for plating and similar services.

Evered & Co., Ltd., show a wide range of plumbers' brass foundry, gas joints and governors, as well as domestic plastic equipment.

Fisher & Ludlow, Ltd. (Material Handling Division) exhibit 'Flowlink' chain and belt conveyors, 'Fisholow-Hapman' tubular conveyors, and many types of flooring and storage equipment.

Recording Instruments

The Foster Instrument Co., Ltd., shows indicating, recording, and controlling resistances, thermo-couples, and radiation pyrometers—deflectional, potentiometric, and electronic. Optical pyrometers, portable potentiometers and introscopes for visual internal inspection are also shown.

The General Electric Co., Ltd., exhibits include power generation and distribution plant and the motors, furnaces and other equipment which apply power in industry. Communications equipment, electronic devices, and lighting apparatus is also on display.

John Harper, Ltd., manufacturers of grey and mechanite iron castings, show a wide selection of applications for this material, mainly in the domestic field.

The Harris Engineering Co., Ltd., shows to advantage its gas infra-red radiant heaters (Schwank patent), unit heaters (flued and unflued), centrifugal fans and electronic air cleaning equipment.

Tube-bending Machinery

Hilmor, Ltd., shows a range of hand-operated, hydraulic, and motorized tube-bending machinery, with portable machines for the gas fitter, and power-operated mandrel benders for the production of full bore bends without fitting an extra short radii. A newcomer is the three-point bender, which will handle from ¼-1 in. nom. bore gas tubing.

The Horstmann Gear Co., Ltd., shows the range of Horstmann precision gauges, including screw and plain plug and ring types as well as the patent adjustable thread caliper gauge which embodies many new advantageous features.

Imperial Chemical Industries, Ltd., Metals Division, on an outstanding display, show examples of various materials. The eye-catcher on this stand is a display of full-scale sections of British Railways diesel multiple-coaches of a type used on the Birmingham/Castle Bromwich Service during the Fair.

C. H. Johnson (Machinery), Ltd., exhibit a wide range of centrifugal and diaphragm pumps, pipe-laying winches, compressors, conveyors, and mechanical handling equipment.

Keith Blackman, Ltd., show all types of axial and centrifugal fans, blowers, air heaters, dust exhausting and collecting equipment and smoke removal equipment. Of particular interest is the gas heating and controlling apparatus.

The Kleen-e-zee Brush Co., Ltd., exhibits a remarkable range of industrial brushware, as well as cleaning guns, 'Florigene' dust-allaying fluid, and 'Keza' tube burnishers.

James H. Lamont & Co., Ltd., show copper pipe fittings, 'Securex' fittings for light and heavy gauge copper tubes for cold and hot water supply and steam heating.

R. A. Lister & Co., Ltd., exhibit a two-tons capacity elevating platform model, and a 1,000 lb. fork lift model Lister auto truck. Industrial power loaders with loading heights between 3 ft. and 12 ft. are also exhibited.

Messenger & Sons (Birmingham), Ltd., show fittings for gas heating and cooking equipment, including oven and jet taps, thermostats, union couplings, injectors, etc.

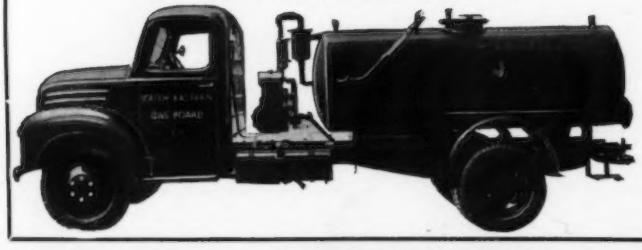
Parkinson & Cowan Industrial Products exhibit examples of their gas-fired radiant heat tunnel and panel drying and storing equipment, as well as conveyors, temperature indicators, laboratory test meters, pressure gauges, rotary gas meters and flame failure equipment.

CLEANING BLOCKED SERVICE PIPES METHODS REVOLUTIONISED BY

ALLAN TAYLOR SERVICE PIPE CLEANING OUTFIT

The 75 gallon Allan Taylor pressure/vacuum service cleaning equipment complete with exhauster which can be used for vacuum or pressure. Normally used as a trailer unit and towed by a 10 cwt. van. Clearly seen (central in photograph) are the cyclone and test bar. This additional equipment enables the operator to make pressure tests before and after cleaning the service pipe, the test taps passing 50 cu. ft. or 100 cu. ft. as required. By using the Cyclone the dust drawn from the service pipe is deposited in the sight glass for inspection and can then pass into the easily removable container below. The arrangement further enables the operator at the machine to determine whether or not there has been any success with a cleaning operation. The extractor also prevents the greater part of the rust dust from entering the 75 gallon cylinder.

SYPHON EMPTYING OUTFIT



The Vacuum Syphon Emptying Outfit illustrated is mounted on a 4 ton **Thames** Chassis. A 600 gallon galvanised tank is fitted. A rotary type exhauster is driven by a 4 b.h.p. four-stroke air cooled engine, mounted on a sub-frame behind the cab. The tank is fitted with a flame-proof vent and the outfit can be used for high or low pressure syphon emptying. A large manhole at the rear allows the tank to be cleaned easily. A sight glass is fitted to enable the operator to know when the Syphon is emptied. Twenty-five feet of 1½ in. suction hose is supplied with the outfit. The outfit can be used for vacuum or pressure working.

ALLAN TAYLOR (ENGINEERS) LTD.

WANDSWORTH HIGH STREET, LONDON, S.W.18 *Telephone: VANdyke 4433 (five lines).*

Radiation Group Sales, Ltd. (Solid Fuel Division) concentrate on solid fuel-burning appliances designed to reduce smog and progress fuel efficiency. The Whole-house Warming unit is included, and shown for the first time at the B.I.F. is the 'Nautilus 55' coke boiler and the Mark II version of the 'Chevin' boiler flue set.

Ransomes, Sims & Jefferies, Ltd., known to the gas industry for their lifting trucks, etc., show primarily lawn mowers at Castle Bromwich this year.

Magnetic Equipment

Rapid Magnetic Machines, Ltd., display electric magnetic lifting and suspension magnets, magnetic clutches and brakes, percolators for ceramics and magnetic floor sweepers.

The Rawlplug Co., Ltd., exhibit their usual wide range of fixing devices, including Rawlbolts, Screwanchors, Boltanchors, toggles, manual and mechanical boring tools, and various drills and scaling compounds.

Rozalex, Ltd., makers of barrier creams and conditioning creams for skin protection, demonstrate their latest products together with the Rozalex dispenser.

R. Russell & Sons, Ltd., show the 'Dainty Minor' gas cooker which is well known in the gas industry as a finely finished appliance particularly designed for small kitchens and flats. It is equipped with heat controller to oven, and hotplate with two boiling burners and a griller.

Sankey-Sheldon, Ltd., specialize in steel office, factory and garage equipment. Their exhibits include bins, shelving, gallery flooring, lockers, partitions, and filing cabinets, etc.

The Sigma Instrument Co., Ltd., displays various multi-dimension inspection machines, including automatic types with magazine feed and conveyor belt sorting, as well as pneumatic comparators and bench micrometers.

James Southerton, Martineau and Smith, Ltd., exhibit gas cocks, main cocks, unions, and a variety of plumbers' brasswork.

Gas Thermostats

Sperryn & Co., Ltd., display their well-known gas thermostats for both industrial and domestic use, as well as relay valves and flame failure devices. Spring-loaded, self-lubricating main cocks and small fittings are also shown.

Stelcon (Industrial Floors,) Ltd., have formed the floor of their stand with anchor steel plates and steel clad flags, and are exhibiting for the first time the steel-clad raft, which combines both sub-floor and wearing surface. Stelcon storage walls are also exhibited.

Tangyes, Ltd., exhibit hydraulic jacks of all capacities, including the new light-weight 'Hydralite' jacks, range 15-20 tons. A sectional 'A.R.' centrifugal pump showing the working parts is another exhibit, as well as a slow combustion industrial heating stove.

Steel Tubes and Fittings

Wellington Tube Works, Ltd., display steel tubes, tubulars and fittings, manipulated pipeworks for steam main installations and process work, heat exchangers, concealed heating panels and industrial radiant heating panels, etc.

The Wellman Smith Owen Engineering Corporation, Ltd., exhibits the cab of a 100-ton ladle crane, for which the cab and controllers were designed and installed by the company in co-operation with the Department of Scientific and Industrial Research.

Charles Winn & Co., Ltd., show valves and fittings for gas, steam, water, etc., for use in boilers, turbines, gas and other engines, heating installations, and gas works.

The Yorkshire Copper Works, Ltd., shows a colour film, 'The Yorkshire Point of View,' and a wide selection of solid drawn tubes in various metals and alloys. Condenser heat exchanger tubes and refrigeration tubes are included, as well as a range of capillary fittings.

S.B.G.I. Golfing Circle

The Spring Meeting of the Society of British Gas Industries Golfing Circle will be held on Monday, May 23, at the Hayling Golf Club, Hayling Island, Hants, when members will compete during the morning for the Thornton Victory Cup and the Davis Cup, by 18 holes medal play. Members of the Institution of Gas Engineers will also be competing for the Coronation Plate.

All those wishing to compete at this meeting and who have not received notices are asked to get in touch with the Hon. Secretary, Mr. C. T. C. Woodall, Terminal House, Grosvenor Gardens, S.W.1.

'Gas Journal' Photographer Exhibits 3D Slides

Stephen Tennant, A.R.P.S., staff photographer of Walter King, Ltd. (publishers of the 'GAS JOURNAL' and 'GAS SERVICE') has nine exhibits at the Royal Photographic Society's Spring Exhibition of Applied Photography, stereoscopic photography section. Some of his stereoscopic (3D) pictures are of gas industry installations. One is of cooling towers, others are of an ammonia washer, a flame failure device, and an eye-level grill. The exhibition is open to May 27, and is at 16, Princes Gate, London, S.W.7.

Coking Plant for South Africa

Woodall-Duckham Construction Co., Ltd., announce that they have just received another order for a coke oven plant valued at about £1¼ mill. from the South African Iron and Steel Industrial Corporation, Ltd.

This further plant will be sited at Pretoria and is in addition to the two coke oven plants located at Vanderbijl Park and Pretoria respectively ordered by the Corporation from the same Company in November last year.

The total value of these three plants, which will be capable of carbonizing more than 1¼ mill. tons of coal per year, will be about £3¼ mill.

Building Plant Exhibition

The Ministry of Works Building Plant Exhibition on the Queenslie Industrial Estate, Glasgow, from June 8 to 15, will be opened by the Rt. Hon. Lord Bilsland at 3 p.m. on June 8. On following days the hours of opening to the public will be 10.30 a.m. to 6 p.m., with extended time until 8 p.m. on June 10 and June 14.

More than 60 exhibitors will occupy space in the 150,000 sq.ft. of exhibition area, and the exhibits will cover the whole range of modern building plant equipment and tools. A demonstration area of 80,000 sq.ft. has been provided for exhibitors and will be in daily use. Two special features already scheduled are the staging of a full scale demonstration of housebuilding using modern mechanical plant, including a tower crane, weighbatching plant, mechanical loader, drain trench digger, etc; and practical demonstrations of good and bad scaffolding, and methods of timbering excavation. In the site cinema films of general and craft interest to the building industry will be shown daily.

Anglo-Spanish Friendship

The British Chamber of Commerce for Spain, representing in North Eastern Spain the Federation of British Industries, has instituted a scheme by which young Spanish engineers and technicians are granted studentships to study their particular industry in England for a period of two months or so. The expenses are borne entirely by the Chamber of Commerce. The object of the scheme is to promote Anglo-Spanish friendship and to encourage the students to look to English sources for the requirements of their industry in Spain.

The first studentship has been granted to Sr. José Fómica-Corsi, who is employed by Catalana De Gas y Electricidad at its Barcelona gas undertaking. He is now in England attached to the North Thames Gas Board, where he is studying gas manufacture, distribution, and appliances.

Productivity in the North Western Gas Board area, measured by the average amount of gas made available per employee, was up by 11½% in March, compared with average for March, 1954. The number of employees at the end of March, at 19,217, was 1½% less than the total of 19,466 employed at the same time a year previously, while the amount of gas made available during the month was up by 10%.

The Scottish Fuel Efficiency Committee is co-operating with the Scottish Education Department in promoting fuel efficiency in Scotland's 3,000 schools. Sir Patrick Dollan, Chairman of the Committee, announcing this in Glasgow, said that it was the biggest campaign of its kind they had tackled yet. Sir Patrick said that demonstrations and lectures would be given to janitors and administrative officials in the 33 educational areas so that they would be tuned up for the school reopening in the autumn.

Six Hundred Blackpool Invaders

Employees of Robert Dempster & Sons, Ltd., at Rose Mount Iron Works, and their guests, numbering about 600 in all, visited Blackpool on April 23 in celebration of the firm's Centenary by invitation of the Directors. Leaving the works at 9 a.m. the party travelled in 16 special coaches, stopping for coffee en route. On arrival at Blackpool, lunch was served in the Spanish Hall, Winter Gardens, at which the Mayor and Mayoress of Blackpool were present. Bouquets were presented to the Mayoress and Mrs. B. C. Morton, wife of the Managing Director of the firm.

The Mayor of Blackpool, Alderman Will Ogden, J.P., in extending a civic welcome to the party, said he had met Mr. Morton 15 years ago, and his wife had spent her early life in Elland. He was glad to see so many happy faces, an indication of the cordial spirit prevailing between employer and employee. He referred to Mr. Fred Bedford, his wife's brother, who had gone out to Singapore as Resident Engineer in charge of the erection of gas plant for Dempsters, and had later accepted the position of Gas Engineer there. He had been taken prisoner by the Japanese during the last war and had died six months ago. The Mayor commended the virtues of hard work in order to build up a responsible and respectable future, and Blackpool was there to offer them some relaxation from their pursuits.

Mr. B. C. Morton, Managing Director, in his reply, addressed the assembly as 'fellow-workers' and on their behalf thanked the Mayor and Mayoress for attending at short notice. He paid a tribute to the late Mr. Fred Bedford, whom he missed very much. It was a distinction to the town of Elland when he went out to Singapore.

He gave a special welcome to the old servants of the Company, who were present, and mentioned that in Coronation Year, 25 employees who had completed 40 years service had been presented with gold watches. He was pleased that, in the firm's Centenary Year, six more employees had completed 40 years, and the Mayoress had graciously consented to make similar presentations that day. The recipients were:—F. Hanson (foundry), J. Mellor (maintenance), F. Broomhead (constructional), N. Stott and H. V. Crossland (gas drawing office).

The Mayoress having made the presentations, wished those present good luck, happy greetings, and an enjoyable day.

Mr. E. Green (Fitting Shop) expressed their appreciation of the arrangements, and thanked the Mayor and Mayoress for attending.

Mr. E. Aspinall, a Director, was in charge of the arrangements.

The Mayoress of Blackpool (Mrs. W. Ogden) making a long service presentation to Mr. H. V. Crossland of the Gas Drawing Office. Left to right are the Mayor, Mr. B. C. Morton, the Mayoress, and Mr. H. V. Crossland.

North Thames Gas Up 1¾d.

Gas in the North Thames area will cost 1¾d. more per therm at the flat rate from June 1 and if coal prices rise, the 'Board could not absorb the cost of it.' Mr. Michael Milne-Watson, C.B.E., Chairman of the Board, announced this to the North Thames Gas Consultative Council on May 5. At the same time he introduced a new two-part tariff for consumers with small businesses, small hotels or boarding houses.

After the statement had been made a questioner asked: 'How much is it proposed to take to general and specific reserves for the year ended March 31, 1955?'

After pointing out that he was not allowed to divulge the accounts, Mr. Milne-Watson said he would tell the Council this: 'We have finished the year on the wrong side.'

Mr. Milne-Watson, in his statement, said that since February 1, 1952, the Board had kept the price of gas pegged. 'During that period—well over three years—it is probably safe to say that the price of no commodity in wide and daily use has not gone up; for the Board, there have been major increases in operating costs that make a continuing charge on the undertaking.' The annual cost of those increases per annum, comprising coal, including railway charges, and salaries and wages, less increased revenue from coke and breeze and reduction in cost of gas oil, amounted to £3,297,000.

'As I told you last summer,' continued Mr. Milne-Watson, 'we had relied on economies and increased efficiency to offset the increases in cost that we had then suffered but, unfortunately, the time comes when not everything that management and teamwork can do avails against the pressure of inflation. The Board have a statutory duty to balance their accounts and this cannot be done with gas at its present price in the face of such increases in cost.

'The Board have taken stock of the situation and, most regretfully, have decided to increase the flat rate price of gas with effect from June 1, by 1.75d. a therm, making that price 20.85d. per therm. All prices under special tariffs will likewise be increased by 1.75d. per therm. This increase is expected to bring in £2,800,000 in a year which, taking into account our economies, should enable us to make ends meet at present costs.'

Mr. Milne-Watson continued: 'I wish I could hope that this, for some time at least, was the last word. You will, however, have seen mention in the Press of a possible further increase in the price of coal. In spite of the disappointment we suffered last year, when the price of coal went up in May, it would not perhaps be right to regard another increase as inevitable; but if there were such an increase the Board could not absorb the cost of it and would be forced to pass it on to the consumer.'

The Board Chairman said he would take the opportunity to announce another matter which had concerned the Board for some time. It concerned those non-domestic consumers whose consumption of gas was not large enough to qualify for any of the Board's special tariffs and who were not eligible to take gas under the special two-part tariff for domestic consumers.

It had been decided to introduce for the benefit of the non-domestic consumer a two-part rate which would be an alternative to the general purposes block rate. The new tariff would consist of a fixed quarterly standing charge of £1 1s. 8d. for each main meter and a commodity charge of 18.25d. per therm and would be conditional upon the signing of an agreement for a minimum period of 12 months; meter rent would be charged in addition. 'Since the new tariff is an alternative to the general purposes block rate,' he added, 'consumers will not be

allowed to apply for both tariffs; in other words, all the meters of a consumer (if he has more than one), must either be charged under the existing general purposes block rate, in which case aggregation of consumption is permitted on application, or under the new two-part rate, in which case a separate standing charge and meter rent will be payable in respect of each meter for which the consumer elects to take the two-part rate.'

The new tariff was intended to meet the needs especially of consumers with small businesses, small hotels or boarding houses and the like, who provided a reasonably steady gas load. Not only did they deserve some concession, but 'the introduction of the new tariff should encourage the use of gas.'

In reply to a question put to him by the meeting, Mr. Milne-Watson said if the price of coal went up 'I am afraid the price of coke will also go up.'

Since nationalisation, the price of gas per therm has increased in the North Thames Gas Board's area as follows: In February, 1948, the price was 15d. per therm; in September of the same year, the price rose to 15.6d. Another rise in January, 1951, brought it up to 16.1d. and in the following July to 17.6d. The last rise took place in February, 1952, raising the price to 19.1d.

A member of the Council sharply criticized the Board for introducing a new tariff to one class of consumer when, at the same time, raising the price to industry, with the attendant influence upon the price of their goods.

Mr. Milne-Watson admitted the pertinence of the question. But this group of consumers had been badly treated in the past. They had not had the advantage of the ordinary domestic consumers' tariff, although hotel and small boarding house proprietors were dealing very largely with domestic consumers.

Asked about the possibilities of oil in gas manufacture and whether it might cheapen gas Mr. Milne-Watson said: 'We are at the present time investigating the expanding use of oil in gas manufacture on a large scale. The only warning that I might issue on that subject, is that the price of oil is also subject to increases, sometimes overnight. But we are looking more and more as an industry to oil, and we are also searching for natural gas in this country. As an industry, we are spending £1 mill. on looking for natural gas. If they should strike it rich in Sussex, the North Thames Gas Board, I am sure, would get a cut of the bread. A pipeline would not be out of the question, and we are, of course, very hopeful.'

If the question related to world oil, 'There I can assure you that we are using, as and when it is economic to do so, a maximum quantity, and are hoping to increase that use as and when coal prices itself out of the gas-making market.'

Snaps from Skegness

Here are some pleasant photographic recollections of the sixth annual staff conference of the East Midlands Gas Board, reported in last week's issue. On the right are W. Bestwick (Organization and Methods Officer), Dr. Norman Williams (Senior Medical Officer), and J. R. Knott (Marketing Officer), each of whom presented a paper.

Below, in conversation outside the Grosvenor House Hotel, are (left to right) V. J. J. Siddons (Manager, No. 8 District, Sheffield and Rotherham Division); A. W. Field, (Personnel Officer, Sheffield and Rotherham); E. B. Craddock (Manager, Northampton Group); F. G. Rollings (Sales and Service Manager, Northampton); and L. Hurst (Coke Oven Officer, Sheffield and Rotherham).

Mr. R. M. Wilkinson (Manager, Nottingham District) received a pleasant surprise on the Thursday evening when a private party was held at the Lumley Hotel in honour of his 62nd birthday, which fell that day. In our bottom right hand picture the Notts. and Derby Division General Manager, Mr. K. L. Pearce, presents him with a special birthday cake

Wales and Monmouthshire Section at Tenby

The attendance at the Spring meeting of the Wales and Monmouthshire Section of the Institution of Gas Engineers on April 29 was suddenly depleted when news reached Tenby of the strike of cokemen at Nantgarw Colliery. However, there was no diminishing of enthusiasm for the principal items on the agenda. They were an address by Dr. G. E. Foxwell entitled 'The Gas Industry in relation to the National Demand for Fuel,' and a paper entitled 'The Challenge of Grid Supplies.' The first section, dealing with domestic gas supplies, was read by Mr. W. F. Edwards, General Manager and Secretary of the Port Talbot undertaking, while the same theme in relation to industrial and commercial gas supplies was developed by Mr. W. H. Tarn, Industrial and Commercial Gas Engineer, Wales Gas Board.

MR. O. P. CRONSHAW (Rhyl) in the discussion which followed Dr. Foxwell's address, said the figures they had seen were most interesting and they could do nothing but take notice of them. In relation to the Beaver Report he wondered where the smokeless fuel was coming from in some areas. A lot of the gas would come from the coke ovens, whose coke would go towards steel production. If gas could supply the need for smokeless fuel the gas industry was prepared to do it.

MR. J. H. DANIELS (Milford Haven) on the subject of tariffs said he gathered that Dr. Foxwell favoured the principle of competition between tariffs. The National Coal Board, sometime ago, cast overboard all the prices and conditions that had arisen in the course of many years and set to work to evaluate coal and fix prices for technical and commercial reasons. He had never heard the principle of that method challenged, although they had heard the prices challenged. What was his view on the possibility of extending that method to the whole of the fuel requirements of this country? The whole problem was to relate the cost of fuels one to another instead of allowing the war to go on between gas and electricity with the inevitable result that each side was spending more capital.

Dr. Foxwell said the Government held the view that there should be perfectly free competition between fuels and every fuel should be priced at the true cost of supplying that fuel under those conditions. If they did that they would find the competition problem would resolve itself. Unfortunately, with electricity, industry paid for the domestic consumer to some extent.

MR. M. S. GASKILL (West's Gas Improvement Co., Ltd.) said Dr. Foxwell had dealt with his subject with such thoroughness that it was difficult to discuss it. He had painted a full and serious picture of our national position, namely, that we wanted more coal and there was very little possibility of our having more. The only alternative was to apply the coal to its right purpose and to prevent the wrong use of that coal. In Yorkshire and Durham coalfields less than half the gas making and coking coals were used for that purpose and it was a matter which should be put right. It had been suggested that the domestic load should be met by gas. In no country in the world, except perhaps the United States, was the domestic load able to be met except by solid fuel. It could be stored and that was of great advantage to the small consumer. Oil, electricity, and gas could not meet that requirement. The gas industry was a two-fuel industry and there was a tendency to forget that. It was important to realize that coke should not be regarded, as in the past, as unavoidable and sometimes a rather regrettable result of carbonization, but should be regarded as an end in itself.

MR. W. K. TATE (President of the Institution of Gas Engineers) said there was some difficulty with regard to the all-gas house. Much as they would like it there was the question of storage and price. He did not feel so upset about solid fuel production. There were all kinds of ways in which the requirements of the Beaver Committee could be met.

MR. J. F. RUST (Newport) proposing a vote of thanks to Dr. Foxwell, described the address as an economic digest of the fuel industry in general and the gas industry in particular.

MR. K. E. TIDDY (Carmarthen) seconding, said Dr. Foxwell was 'a scientist giving us an unbiased view of what we ought to get.'

MR. A. PICKARD (Swansea) in the discussion which followed Mr. Edwards' paper, said Mr. Edwards had indicated three challenges—the challenge of reducing consumption per consumer; the challenge of smoke abatement, and the important subject of grid supply. The greatest contribution that they could make was to see that the load was built up as quickly as possible. On the question of gas units he thought that if they were to have them they should be of the same heat value as an electrical unit. To tell a consumer that a unit of gas was 5 B.Th.U. and of electricity 3,400 was no comparison at all. The layman did not understand therms today.

MR. O. P. CRONSHAW said he agreed with Mr. Edwards that the distribution system should be put in order, but he appealed to members not to refer merely to South Wales when talking of grid supplies. 'We have grid supplies in North Wales now and have put bulk supplies into several places in the past month,' he said.

MR. J. H. DANIELS said he was at a loss to see what positive value a gas unit would be in selling gas and gas equipment to consumers. Surely the last thing to talk about was the price.

MR. K. E. TIDDY said changing to a gas unit was giving the electricity boys a peg on which to hang their hats and if a change was to be made it should be a unit of 5,000. He did not think Mr. Edwards had mentioned the vital facet of service. There was not a lot of difference either way in price today and it seemed to him that the gas industry could score every time if it gave a 100% service. Another point Mr. Edwards had omitted in dealing with competitive conditions was the tremendous number of potential electricity salesmen as a result of the popularity of television. All radio salesmen and maintenance men had friends and they thought in terms of electricity.

MR. W. CLARK JACKSON (Neath) said he thought the challenges could be met in three ways—constant quality, adequate pressure coupled with controlled service, and adequate after sales service.

MR. G. FITTON (Neath) opened the discussion on Mr. Tarn's Paper. He was pleased, he said, to see that stress was laid on availability and good service. Mr. Tarn had drawn attention to the

John Wood (Bangor) entertains some of his fellow members with a good story at the Tenby meeting of the Wales and Monmouthshire Section of the Institution of Gas Engineers. Left to right are W. E. Whitney (Bridgend), C. C. Evans (Tondu), John Wood, H. J. Stanley (Penmaenmawr), and H. Allerton (Llandudno).

advantages of given undertakings with extra load. There was rather a fallacy in some of the figures. He postulated there would be no change in certain overheads, but that was rather an unlikely circumstance. His figures were an arithmetical over-simplification to the problem. They were only true if all parts of the undertaking bore an equal share per therm. The overheads should be in proper proportion to the type of load and by the nature of the load would be much less in pence per therm than the average as a whole.

He thought they were in danger of overstating the case for the salesman. He was no more important than all the other people who did equally efficient jobs in other spheres. He also emphasized the value of maintenance contracts, especially in the catering type of equipment.

MR. S. ARMITAGE (Parkinson and Cowan) spoke of the importance of co-operation between industrial oven manufacturers and industrial gas engineers and gas users. He thought it true to say that a completely routine industrial project was non-existent.

MR. E. M. EDWARDS (Member, Wales Gas Board) said the greatest single task confronting the Board was the development of gas sales. They were in sight of supplying 94% of their gas through their grid systems. Having achieved that clearly the next point was to develop matters so that the difference between the average cost in the holder and the average selling price was a minimum. The greatest single factor in any sales development competition was the energy and enthusiasm of the manager and those he held responsible. Sales by gas undertakings were the same as anyone else's. The commodity to be sold and its quality must meet the customers' needs; they must always be able to supply it when he wanted it, and the terms of sale must suit the customers' pocket.

MR. J. POWDRILL (Cardiff) said the essence of the two papers had been that they said, 'Give us the tools to do the job to promote development and take up the challenge.' He made a plea to his chiefs on the Board that they should have a more complete and factual outlook. Mr. Edwards had made a strong plea for one of the tools in respect of tariffs. He felt that the two-part tariff was obsolete. Their electrical friends operated one for three decades and had had tremendous experience of it. The gas industry had always considered it had been an excellent promotional angle on selling on their part. Now they had scrapped it and introduced a simple universal two block tariff in its place and the more he studied it the more convinced he was that they had developed an extremely fine promotional sales tariff.

Among other items on the agenda was the presentation of prizes to Messrs. W. Cornelius, A. MacFarlane, D. Thomas, G. Griffiths and E. Cooper who had gained national certificates. Presenting the prizes, Mr. J. F. Lloyd (Wrexham) said education in the technique of the industry was essential and these encouragements offered by the Board were greatly appreciated.

Deputizing for J. H. Chapman (Chairman), who was recuperating in the Channel Islands after a long illness, J. F. Lloyd (Wrexham), Senior Vice-Chairman, presided at the official luncheon. With him are Councillor John Tipton (Mayor of Tenby), W. K. Tate (President of the Institution), T. Mervyn Jones (Chairman, Wales Gas Board), and Sir Frederick Rees (High Sheriff of Pembrokeshire).

MR. W. K. TATE, supporting Mr. Lloyd's remarks, said it was essential for their progress and indeed their survival that they should have a constant intake of people adequately qualified to deal with all the many advances in their techniques today. He congratulated the Wales Gas Board on what it was doing to meet this need. The Institution was materially revised some years ago because it realized it was tending to fall behind other engineering and technical institutions in this country and gas engineers, even after years of study, were unable readily to become members of kindred bodies without going through the whole mill again. Now that they had started to link themselves to other institutions of engineers they were pushing on with conferences with other branches and hoped any students who proceeded to membership of the Institution would have gone a long way to becoming members of other organizations as well.

The Official Luncheon

Proposing the toast to the Wales and Monmouthshire Section, Mr. Tate said 'Fifty years of service is a long time and I cannot conceive any state of circumstances in our industry when a body such as this will not be of value. In Wales you have only one authority in the gas industry. That authority is notable in this country for the progress it has made since 1949 and the manner in which it has exploited all the various sources of gas to hand. The members of this Section have played a very worthy part and a very successful part in that progress.

'But privileges bring with them responsibility. There is no doubt that because of the complexities of our techniques and the tremendous speed of development it has become more and more inevitable for the human mind to devote itself increasingly to a more confined range of activity in order to master the problems and the tools that are available to deal with those problems. That, I am sorry to say, appears to be a development of modern industry and leads to that horrible thing—specialization.

'So this Section has a duty to bring before its members at their meetings a wide field of topics for discussion. Congratulations on your choice of papers today. They will improve us all by refreshing our minds and giving us a broad outlook. You have another Association in Wales which caters for those whom we call Juniors. They suffer from the same geographical difficulties and the same technical difficulties. Give them all possible support in these formative years.'

Mr. Tate also pleaded for support for the Benevolent Fund and concluded with a note of regret for the absence of the Section Chairman, Mr. J. H. Chapman, who is convalescing in the Channel Islands.

MR. J. F. LLOYD, Senior Vice-Chairman, replying to the toast, said: 'We live in a changing world. That is certainly true of the gas industry and these changing conditions make it esential that those who direct its affairs should be willing under proper safeguards to try out new methods and techniques. 'We are very fortunate in Wales because our Board in this race for success in development will be at the very least sure of a place.'

There was, he said, room for men with brains and knowledge and the Institution played a great part in the dissemination of knowledge. Its education scheme provided for the training of juniors and papers read made public the latest results of processes both old and new.

MR. T. MERVYN JONES (Chairman, Wales Gas Board) proposed the toast to the visitors and the Mayor of Tenby (Councillor JOHN TIPTON), who had earlier extended a civic welcome to the delegates, responded.

B.G.S.A Conference at Blackpool

Membership Continues to Expand

The annual conference of the British Gas Staff Association was held at Blackpool on May 6 and 7 under the chairmanship of Mr. W. E. Webb, and the Friday afternoon session was addressed by Mr. D. P. Welman, Chairman of the North Western Gas Board. Among the many resolutions passed was one asking for the removal of restrictions from gas space heaters and water heaters; another advocated immediate steps to implement the recommendations of the Beaver Committee on Clean Air.

MR. WEBB, in his opening address, said the fact that the conference had in no way lost its appeal was evidenced by the large number of members attending for the first time and by the presence of so many of the older members whom he recalled having met at many previous conferences. As the years passed it was inevitable that the number of older members would diminish, and it was with regret that he had to refer to the untimely death of the first vice-chairman of the British Gas Staff Association, Mr. P. Stephenson, of Croydon.

Mr. Stephenson, one of the early pioneers in the cause of gas staff organization, would long be remembered for the yeoman service which he so freely and generously rendered to them all. A loyal and devoted friend and colleague, the B.G.S.A. was the poorer for his passing and he asked the conference to stand for a moment in silent tribute to his memory.

The past year had been noticeable for the number and variety of proposals with which the National Joint Staff Council had had to deal. Salary increases, pensions, intermediate grades, overtime payments, redundancy, Saturday afternoon opening of showrooms and revision of salary scales, were among matters receiving attention. In all of these the B.G.S.A. had played an important and effective part and if it was not possible to say that they had obtained all that they sought he could, nevertheless, affirm with confidence that the foundations of further improvements in the status and conditions of service for gas staffs were being well and truly laid. It was hoped by the autumn of this year to submit to the Gas Council a scheme for the revision of national salary scales, whereby the differentials which existed between salaries and wages previously might be restored, in the opinion of the Association a vital reform, if the gas industry was to continue to attract the right type of young officer and to hold the interest and enthusiasm of existing officers.

Considerable progress had been made in improving the conditions of intermediate grades and every effort would continue to be made to obtain full staff status for all members in that category. Joint consultation, to which they promised their full support, was being effectively operated in most areas and it was with regret that he learned that there yet remained some few managements and staffs who were not giving that wholehearted co-operation which they had a right to expect. Joint consultation could and did help both the industry and the individual and every effort must continue to be made to ensure the smooth working and efficiency of joint consultative committees throughout the gas industry. In that way, co-operation would be assured and friction avoided.

Owing to the closing down of smaller works and the development of plans for supplies of gas other than coal gas it might be that further problems of redundancy would arise in the near future. They would watch the position closely and he had no doubt the Gas Council would not be unsympathetic. Commission schemes for sales staffs had been introduced by a number of gas boards, in some instances without prior consultation or negotiation. The Association held firmly the view that all matters affecting salaries or conditions of service for gas staffs were negotiable with the accredited trade unions and action would be taken in all casse which constituted an infringement of national agreements.

The re-imposition of restrictions on hire purchase by the Chancellor of the Exchequer might be a regrettable necessity but there could be no doubt it acted as an irritant to the housewife and the salesman alike, and, further, had a marked detrimental effect on the campaign for smoke abatement. It was difficult to understand why water heaters, so necessary in the interests of cleanliness and public health, should be subjected to any restriction at all; on the contrary, they believed that the use of water heaters should be encouraged by every possible means. They therefore called on the Government to remove all restrictions on water heaters at the earliest possible moment.

Relations with the Gas Council and the area boards continued in a spirit of friendly co-operation and goodwill which in no way prevented freedom or force of expression of opinion. Officers and members of the B.G.S.A. learned with regret of the retirement of Mr. J. R. Bradshaw, Deputy Chairman of the Northern Gas Board. Mr. Bradshaw, by his broad outlook and genial manner, did much to promote goodwill between staffs and management and he would be sorely missed both nationally and in the Northern Gas Board's area, where he was held in affectionate esteem by all who were privileged to know him.

Membership of the B.G.S.A. continued slowly to expand but there yet remained a considerable number of gas staffs who, while accepting the fruits of joint negotiation, contributed nothing to its upkeep. The constituent bodies forming the National Joint Staff Council were diverse enough to cater for all shades of opinion, political or otherwise, and he urged on gas staffs the wisdom and necessity of joining with their colleagues in the common effort to maintain and improve the salaries and conditions of service in the gas industry. The B.G.S.A. had a proud record of achievement. By comparative standards perhaps a young organization it was healthy and vigorous, its outlook often in advance of others. Its strength lay in the loyalty and enthusiasm of its members. Much was due to the skill of the voluntary officers in the branches and area councils who gave their services so freely and generously in the common cause. The General Secretary, Mr. Henfrey-Smith, had carried out the duties of his office with dignity and skill. He had done well in an exceptionally hard year, complicated by the recent removal of headquarters to permanent and more commodious premises at Bayswater, a move executed with smooth efficiency.

MR. D. P. WELMAN said the most telling thing in this era of progress, applied to the gas industry, was the Beaver Report. It would mean more to their future in the next 10 or 20 years than nuclear fission. It had already got strong public support. If the Government pressed forward with the creation of smokeless zones in domestic areas he thought they could improve smoke conditions very rapidly, with the increased amount of smokeless fuels. 'We shall be asked to step up our coal carbonization by 10 mill. tons per annum in the next ten years,' he said. Pointing out that with the extra production of coke and consequently of gas, there would be a two-fuel industry, he said, 'the very fact that we are assured of our coke market will give us commercial security. If that situation arises—and it will, we can afford to bring the price of gas down for the first time in our history and we shall do it. If we can bring down the price of gas it will sell itself.'

A Manchester Juniors visit planned for May 18 will now take place on May 19. The visit is to the Woodford Works of A. V. Roe & Co., Ltd.

The North Western Gas Board is to issue projecting signs in metal and window signs mounted on perspex to the dealers it has appointed to handle appliance sales on agency terms. Each of the designs has a red background with 'Mr. Therm' in white and 'North Western Gas Board' overprinted in black.

The 'Therm' Players of the Northern Gas Board (Tyneside Division) gave performances on April 21 and 22, of Philip King's Comedy 'Without the Prince'. Both performances were given to capacity audiences, which included Mr. E. Crowther (Chairman) and Mr. J. E. White (Deputy Chairman) of the Northern Board. The play was produced, the set designed, and made by members of the Tyneside Division's staff.

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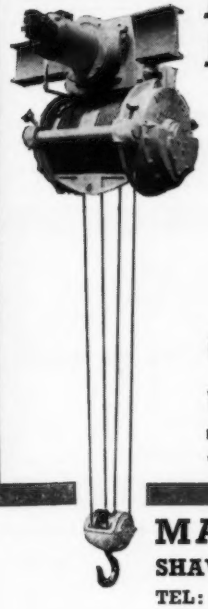

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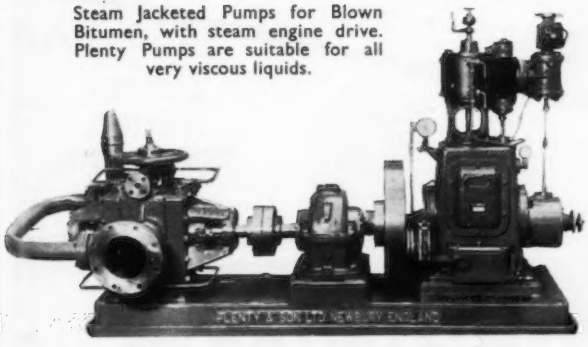

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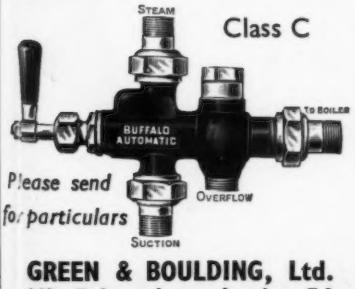

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Applicants should preferably be qualified accountants and have had experience of the audit of accounts of a public utility undertaking.

The salary will be within Grade 10 (£760-£860 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

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Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. A. Allen, Divisional General Manager, West Midlands Gas Board, Gas Street, Coventry, to reach him within fifteen days of the appearance of this advertisement.

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(Classified advertisements continued on page 402)

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APPLICATIONS are invited for the position of Technical Assistant with duties in the Elgin Sub-Group. Candidates should possess the Higher Grade Certificate of Gas Engineering (Manufacture) or equivalent qualification and be experienced in the operation of Gas Works plant.

The salary will be within Grade A.P.T. 7 Provincial "A" £620—£700 per annum with placing according to qualifications and experience. It is anticipated that a rented house may be available if required.

The post is superannuable and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with names of two referees, should be submitted to the undersigned not later than June 4, 1955.

H. S. MILNE,
Divisional Controller.

50 Cotton Street,
Aberdeen.
May 4, 1955.

SCOTTISH GAS BOARD
DUNDEE GROUP—JUNIOR CHEMIST

APPLICATIONS are invited for the position of JUNIOR CHEMIST at the Dundee Undertaking of the Scottish Gas Board, 50, East Dock Street, Dundee. The commencing salary will be within Grades A.P.T. 4/6 (Max. £645 per annum) of the National Provincial 'A' Salary Scales for Gas Staffs, with placing according to experience and qualifications.

Applications stating age and experience should be addressed to the undersigned within 7 days of the appearance of this advertisement.

W. S. JOHNSTON,
Group Manager.

May 4, 1955.

SCOTTISH GAS BOARD
GLASGOW DIVISION
GLASGOW DISTRICT
CIVIL/STRUCTURAL ENGINEERING ASSISTANT

A VACANCY exists in the Engineers Office of the Glasgow Division of the Scottish Gas Board for a CIVIL/STRUCTURAL ENGINEERING ASSISTANT in Grade A.P.T. 6/8 (£565-£740 per annum), with placing according to qualifications and experience.

Applicants should be experienced in reinforced concrete design and detailing, have a knowledge of structural steelwork and building construction.

The post will be superannuable, and the successful candidate may be required to undergo medical examination.

Applications endorsed "CS/EO," stating particulars of experience, etc., should reach the undersigned on or before May 28, 1955.

D. F. YOUNG,
Divisional Controller.

30, John St.
Glasgow C.1.

SCOTTISH GAS BOARD
GLASGOW DIVISION
GLASGOW DISTRICT
MECHANICAL ENGINEERING DRAUGHTSMAN

A VACANCY exists in the Engineers' Office of the Glasgow Division of the Scottish Gas Board for a MECHANICAL ENGINEERING DRAUGHTSMAN within Grade A.P.T. 5/7 (£530-£700 per annum) with placing according to qualifications and experience.

The post will be superannuable, and the successful candidate may be required to undergo medical examination.

Applications endorsed "ED/EO," stating particulars of experience, etc., should reach the undersigned on or before May 28, 1955.

D. F. YOUNG,
Divisional Controller.

30, John St.
Glasgow C.1.

WALES GAS BOARD
PONTYPOOL UNDERTAKING
FOREMAN—MECHANIC

APPLICATIONS are invited for the position of FOREMAN MECHANIC at the Pontypool Undertaking.

The Pontypool Works is a modern Works having a present capacity of four million cubic feet per day. A thorough knowledge of, and ability to undertake repairs to steam plant, including compressors and mechanical plant generally is essential. Previous gasworks, or gasworks contractors experience will be an advantage.

The salary offered will be within Intermediate Grade 7, Provincial A (£530-£575 per annum). Conditions I of the National Salary Scales, and a house at a reasonable rent will be provided.

The successful candidate will be required to pass a medical examination and will be eligible for sick-pay in accordance with the Intermediate Grade Agreement.

Applications, giving details of age and experience, together with two testimonials to be forwarded to the undersigned not later than ten days after the appearance of this advertisement.

H. BUCKLEY,
Acting General Manager.

Wales Gas Board,
Pontypool Undertaking,
Hanbury Road, Pontypool, Mon.

CHIEF SALES ENGINEER. Must be fully qualified with considerable experience of design and construction of large materials handling plant. Age 35-50 years. Applicants who have held good executive positions in a substantial organisation preferred. Salary commensurate with ability and experience. Pension scheme. Accommodation available. Applications to Managing Director, Robert Cort & Son, Ltd., Reading Bridge Ironworks, Reading.

LONDON COUNTY COUNCIL
WESTMINSTER TECHNICAL COLLEGE. September, 1955. ASSISTANT Grade B in Mechanical Engineering Department to teach National Certificate subjects. Should possess a University Degree or be Member of an Engineering Institution. Drawing office experience in Mechanical Engineering with knowledge Gas Works Practice is desirable. Teaching experience desirable but not essential. Burnham F.E. salary scale varies between £511 and £1,012 individual minimum and maximum according to age, qualifications and experience. Application forms from Principal at College, Vincent Square, S.W.1, returnable by 27th May (632).

NORTH WESTERN GAS BOARD
FYLDE GROUP
DISTRICT SERVICE OFFICER—THORNTON CLEVELEYS

APPLICATIONS are invited for the above pensionable appointment at a salary within Grades A.P.T. 8/9 (£660-£800).

The successful applicant will be responsible to the Group General Manager for the Showrooms and Consumer Service in the district, also for general administrative co-ordination.

Detailed applications, giving the names of two referees, should reach the General Manager, North Western Gas Board (Fylde Group), Princess Street, Blackpool, within 14 days.

NORTHERN GAS BOARD
WESTERN GROUP
ENGINEERING ASSISTANT
CARLISLE DIVISION

APPLICATIONS are invited for the position of ENGINEERING ASSISTANT on the staff of the Carlisle Division.

Salary within Grades 6 and 7 (£565-£700 per annum), placing according to age and experience.

The successful candidate will be required to pass a medical examination and join the Board's Staff Pension Scheme.

Applications stating age, experience and giving full details of training and qualifications, together with the names of two referees, should be addressed to The Divisional General Manager, Gas Works, Rome Street, Carlisle, to arrive not later than Saturday, May 28, 1955.

A. R. CROFT,
Group General Manager.

50, Castle Street,
Carlisle.
May 5, 1955.

NORTHERN GAS BOARD
WESTERN GROUP
DISTRIBUTION SUPERINTENDENT—WORKINGTON DIVISION

APPLICATIONS are invited for the position of DISTRIBUTION SUPERINTENDENT, Workington Division. Salary within Grade A.P.T. 9 (£700-£800 per annum) of the National Joint Council for Gas Staffs.

Applicants should have (a) a thorough knowledge of modern methods of distribution, including high and low pressure systems, (b) experience of gas fitting, including installation and maintenance of modern gas appliances, and (c) be capable of carrying out detail work in connection with planning and estimating of new work.

The successful candidate will be required to pass a medical examination and join the Board's Pension Scheme.

Application, stating age, experience and giving full details of training and qualifications, together with names of two referees should be addressed to the Group Chief Engineer, Gas Works, Workington, Cumberland, to arrive not later than Saturday, May 28, 1955.

WALTER KING SERVICES — 1

DOMESTIC UTILISATION OF GAS

by

Norman S. Smith and R. N. LeFevre

PRICE 20/-
(including postage)

FROM
WALTER KING, LTD. 11, BOLT COURT, FLEET STREET, LONDON, E.C.4.

Commercial T.V. with no apologies

W. C. HOLMES & CO LTD · HUDDERSFIELD · LONDON · BIRMINGHAM

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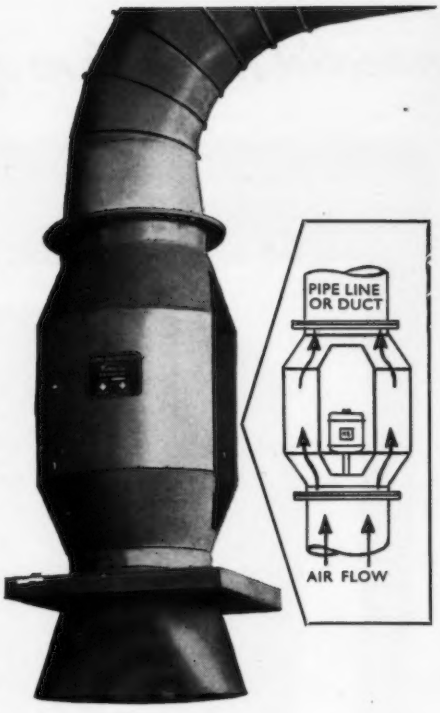
from FUME CUPBOARDS · DE-GREASING, DE-SCALING and DE-OXYDISATION BATHS · PICKLING and NEUTRALISING TANKS IMPREGNATING TANKS · PAINT SPRAY BOOTHS FURNACES and FORGE PRESSES · CONFECTIONERY and BAKING OVENS

BECAUSE within the operational range of these units no other fan compares for price, design simplicity and economy of space. Bifurcated fans are direct driven units which will handle obnoxious fumes and gases up to 350° F. Their easily accessible K.B. made, totally enclosed and weatherproof motors are completely isolated from the fumes or gases handled.
Ranging up to 25″ diameter, the sizes are matched to commonly used pipes and ducts. 10″, 12″, 14″, 16″ and 19″ fans are held in stock. If you want full details of this exclusive fan type write now for Publication No. 28/7



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MILL MEAD ROAD, LONDON, N.17
Fan Makers to the Chemical Industry

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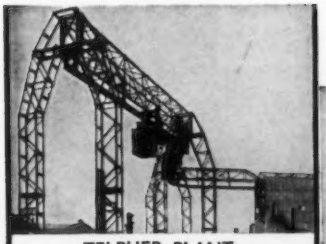
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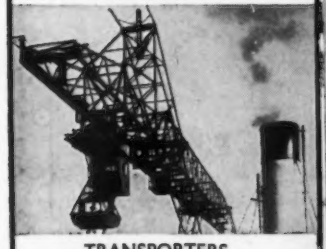
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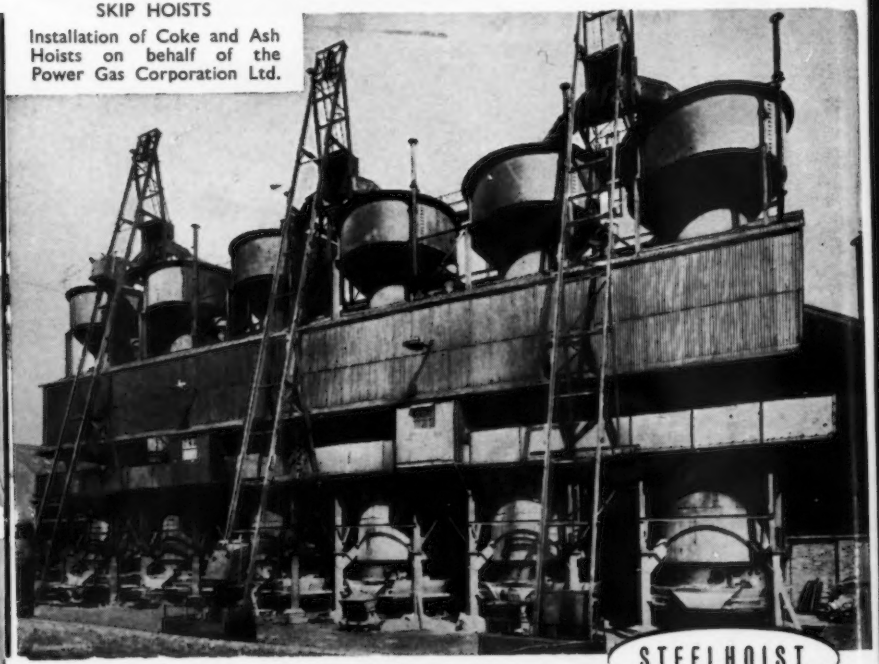
SKIP HOISTS
Installation of Coke and Ash Hoists on behalf of the Power Gas Corporation Ltd.



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Plant for the movement of material in bulk

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Steelhoist Works. Bristol 2. Tel: 78331.

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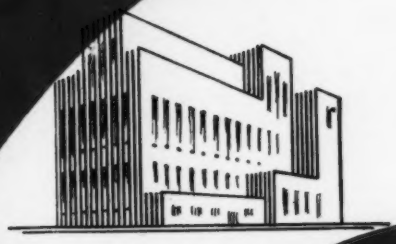
Two sides to the question . .



CONTINUOUS

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. . one answer WEST'S

GLOVER-WEST CONTINUOUS VERTICAL RETORTS
C·O·L INTERMITTENT VERTICAL CHAMBERS

WEST'S GAS IMPROVEMENT COMPANY LIMITED
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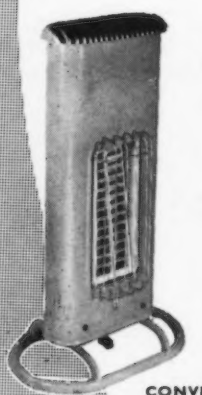
Sure fire winners

The four points which make these portable gas fires so easy to sell :—

'MIJ' PORTABLE FIRE FA/8
Stands 13 inches high.
Chromium plated reflector.

Economy The specially designed Neat burners give perfect combustion with exceptional heat output for gas consumed.

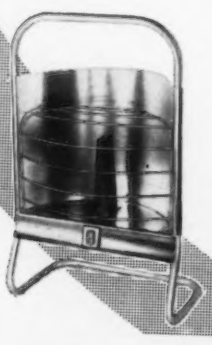
Safety The burners are quite silent and will not light back however low the gas is turned down. All models are fitted with guards conforming to BSS1250.



CONVECTOR FIRE FA/7
Stands 27½ inches high.
Finished beige and chrome.

Efficiency FA/3 and FA/8 have unbreakable steel radiants giving exceptionally long life. The FA/7 distributes heat by radiation and convection from glowing fireclay radiants.

Reputation All FA Neat portable gas fires are made by the manufacturers of the world-famous Ascot gas water heaters, and carry the same guarantee of high quality and performance.



PORTABLE FIRE FA/3
Stands 19½ inches high.
Chromium plated reflector.

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